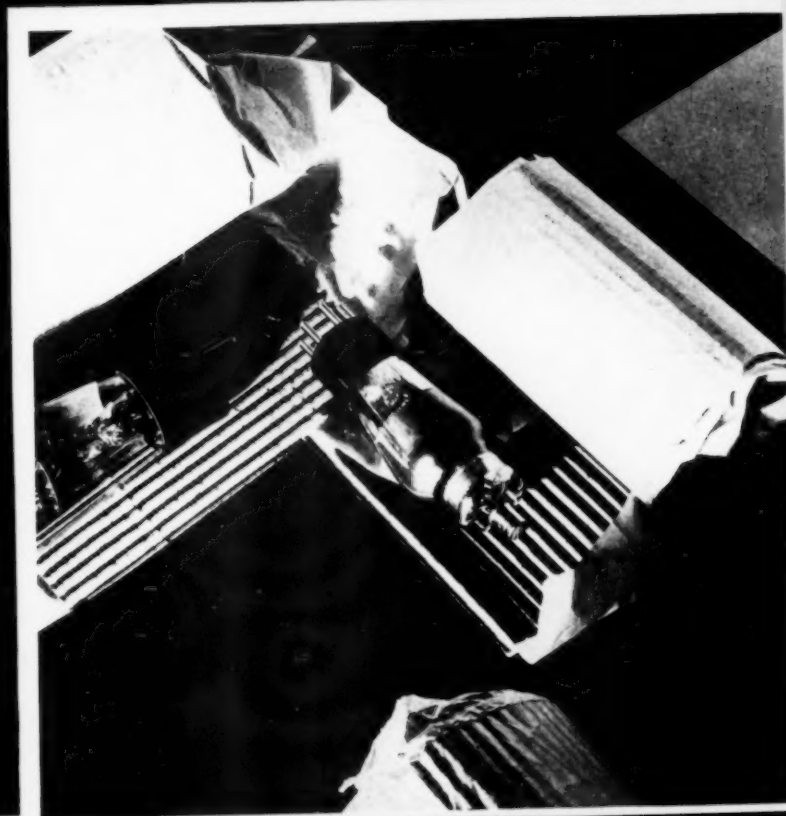


OST



amateur radio

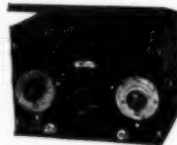


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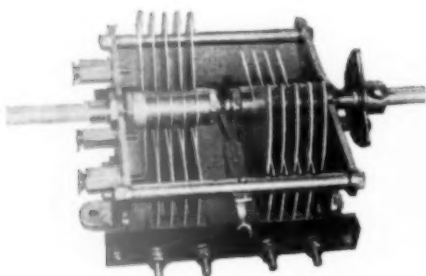
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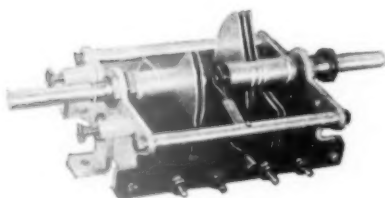
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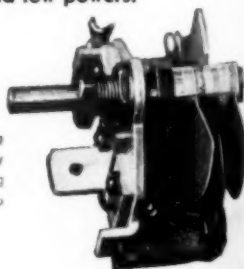
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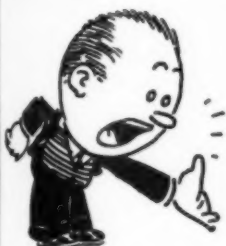
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"THE STANDARD OF COMPARISON"

QST

Published monthly, as its official organ, by the American Radio Relay League, Inc., at West Hartford, Conn., U. S. A.; Official Organ of the International Amateur Radio Union

devoted entirely to AMATEUR RADIO



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3 volts for "A"
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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is non-commercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the world and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite. Correspondence should be addressed to the Secretary.

A directory of the amateur societies affiliated with the League, showing their times and places of meetings, is available upon request.

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THE EDITOR'S MILL

SEPTEMBER, magic month, is upon us. Always the harbinger of a new autumn's activity, it marks this year the opening of the international communication conferences at Madrid. As this issue of *QST* reaches our members, this greatest and most important of radio conferences will be getting under way. After five years, the Washington convention is to be revised, a new treaty is to be written for another similar period. An unbelievable amount of preparatory work has been done by every nation on the globe, and hundreds of people are assembling now to merge their studies and to test their ambitions. A great school for communications, an unconscionable amount of hard work is in prospect. A great theatre of human drama, there will be exhibited there all the hopes and fears, the dreams and obsessions, the wisdom and the stupidity, the vision and the self-seeking of the communications world. What a picture!

For ourselves, this conference comes as the culmination of many months of preparation. It seems to us that for some years back we have been living and thinking only in terms of "Madrid." Undeniably a critical juncture in our individual lives as amateurs, for us in our official capacity it has been a near-obsession, the item around which our entire scheme of things has revolved. We can't help it. We've already lived through that conference a thousand times in our mind's eye. We only hope that some of the more effective of our strategies will recur to us as we actually sit at the conference table!

Within the councils of the American Radio Relay League much thoughtful consideration has been given the representation of amateur radio at the conference. Successive meetings of the Board of Directors, the Executive Committee and the headquarters staff have shaped and polished a point of view and the plans that go with it, for the guidance of the representatives we are sending. Three representatives were named by our Board: Paul Segal, our counsel, Clair Foster, our California director, and y'r ob't s'v't, the secretary. To our most intense regret, Director Foster is unable to go; inability to leave his personal affairs for so long a time has made him feel it necessary to decline. We know this bit of news will be as big a disappointment to our members as it was to us, for we had all looked forward to 'HM's presence and participation at Madrid. The job, then, falls on the old firm of Segal & Warner, who have already been associated in many a minor scrimmage. . . . Meanwhile the International Amateur Radio Union, the world-wide group in which A.R.R.L. represents us of the United States and Canada, has perfected its plans for participation. It will have three delegates present: Mr. Arthur E. Watts, acting vice-president of the Radio Society of Great Britain, Mr. Miguel Moya, president of the *Asociacion E.A.R.*, and again yours truly, as secretary of the Union. We are also pleased to know of the appointment to the French delegation of Mr. Jack Lefebvre, *président-fondateur* of the *Reseau des Émetteurs Français*, as adviser on amateur matters. Several other officials of European societies are likely to be present during the conference. We look forward to the possibilities of a Ham Hq., with an all-night watch, a pot of coffee gurgling on the stove, and the latest news from the front.

The Madrid policies of I.A.R.U. and A.R.R.L. are substantially the same. We stand for the widening of the amateur "40-meter" band to 7000-7500 kc.; the maintenance of all other bands in their present widths but as exclusively amateur territory; the right to

handle third-party messages internationally; the fixing of power limits and similar operating regulations by each administration. Of our further plans it would seem unwise to make this a public statement, although we know you fellows are anxious to know the "dope" and are entitled to the assurance that we're going over there to defend amateur rights and not to see a bullfight.

The general situation confronting the amateur as the conference opens, so far as it is visible from the published proposals, is not greatly different from what one might expect, and certainly much more pleasant to view than it might be. Remembering our experiences at Washington, however, we are not so naïve as to suggest that the full dimensions of what is in the minds of such opponents as we may have is to be found publicly displayed in the Proposals. Yet we have grown so in numbers, in merit and in recognition since those dim days of 1927 that there is no good reason why there should be a general or concerted attack upon us. The gestures discernible at the moment are all isolated proposals. Want to hear them again? . . . There is a plan to assign our frequencies to "private experimental stations" which would include not only amateurs but commercial and government experimental stations, universities, training schools — in fact everything except military and paid-commercial stations. It is proposed to limit our power to 50 watts. A careful study has been made to establish the need of maritime radiotelephony for the exclusive use of the band 1500–2500 kc., to the utter destruction of the amateur 1715–2000 band — and a merry battle promises. European broadcasting wants half of our "80-meter" band. European aviation wants the other half and all of our "40-meter" band, but we are assured that this proposal is so absurd that no serious consideration will be given it. Japan has suggested whittling all the amateur bands down to harmonic shadows of the "20-meter" band, which has the narrowest effective width of any. On the other hand, we are informed that Great Britain, Spain and France have decided to support the present widths of the ham bands. That, coupled with the traditional position of the United States and Canada, is a splendid nest-egg around which other reasonable nations may do a bit of agglomerating. In fact, we are advised that the Spanish administration, through the representations of *Red Española*, active Spanish ham society, is supporting the Canadian proposal to expand our DX band to 7500 kc. instead of 7300. Which is vy swell.

These are the apparent items. We know that, in addition, we shall have to combat the constant machinations of those who love us not, those who want our wavelengths for their own purposes. But we also know that our own Government enters this conference pledged to support and demand our present band widths. Taking it by and large, we expect to bring home the bacon.

Until then, *adios*.

K. B. W.

Midwest Division Convention

Topeka, Kansas, September 10th and 11th

FELLOWS, this is the announcement for the official Midwest Division Convention to be held at the Chamber of Commerce, Topeka, Kansas, Saturday and Sunday, September 10th and 11th, sponsored by the Kaw Valley Radio Club. A cordial invitation is extended to every radio amateur to attend this year's affair. License examinations will be given; Director Kerr will have charge of the general session and A.R.R.L. headquarters has promised Jim Lamb, *QST* Technical Editor for our technical sessions.

(Continued on page 16)

Western New York—Atlantic Division Convention

September 10th and 11th, Hotel Onondaga, Syracuse, N. Y.

DIRECTOR WOODRUFF and A.R.R.L. Headquarters have given their approval to this convention to be held under the auspices of the Syracuse Amateur Transmitting Association. We, therefore, extend an invitation to all amateurs to attend our affair. Plenty of good roads lead to Syracuse, and the old gas buggy should be tuned up for the trip. This convention is taking

(Continued on page 16)

An Intermediate-Frequency and Audio Unit for the Single-Signal Superhet

More About Adjustment and Performance

By James J. Lamb, Technical Editor

AS WAS shown in the article introducing the system of single-signal reception in our August issue, the high-frequency and i.f. filter unit described therein may be used with a tuned-radio-frequency b.c. receiver serving as the i.f. and audio unit. When so operated, the first unit is essentially a glorified short-wave converter and, if the b.c. receiver happens to be one of the better sort with thorough shielding, at least two high-gain r.f. stages and plate detection, excellent results are to be expected. But then all t.r.f. broadcast jobs are not as adaptable as they might be for this kind of work (one reason for short-wave converters failing to give universal satisfaction), and then again none of them is likely to have as good gain and selectivity as we want at the frequency intended for the i.f. in the s.s. receiver, which frequency is at the long-wave end of the b.c. band. Therefore the i.f. and audio unit that has been built for our receiver is offered as an aid to those who, like ourselves, will want to have their receiver all in one piece. Variations in the layout and style of construction may be applied ad lib, of course, as long as there is no jeopardizing the operation of the several basic elements. These will be pointed out. As an example of possible variation in the layout, a single-deck arrangement more suitable for a table-mounted receiver is diagrammed as an alternative to the double-deck relay-rack style that was found more adaptable to our needs. With the latter commercial type of mounting becoming increasingly popular in amateur stations, it is likely that many builders of this receiver will want to adopt the rack-mounting layout described here.

THE LINE-UP

After numerous experiments with i.f. stages varying in number from one to four and with

several types of second detectors, the i.f. line-up that developed was two r.f. stages using 58 variable- μ pentodes, followed by an automatic bias second detector (plate detection) using a 56 triode. Fairly satisfactory results were obtained with a single i.f. stage but the something like 100% improvement brought about by the addition of the second stage made its inclusion an

economic necessity. More than two stages gave no advantage and introduced instability. With the high gain provided by the i.f. amplifier, detector sensitivity became secondary to detector ability to handle large signals without overloading. Screen-grid detectors were tried but were found less suitable than the triodes, not only on account of their lesser ability to handle large signals but also because they were found unsuited to the heterodyne plate modulation system that had been decided upon for c.w. reception. As between the 56 and '27 type tubes as detectors, the 56 won out because of its lower filament consumption and appreciably higher gain. The '24-A won the position in the modulating oscillator for the same

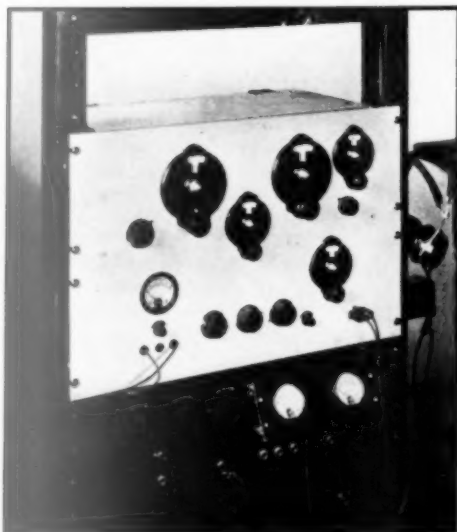
reasons that made it first choice in the h.f. oscillator and in the electron-coupled frequency meters described in July *QST*. It should be pointed out that plate detection is essential with this heterodyne plate modulation at the second detector and grid detection (leak and condenser) will not work properly for c.w. Grid detection addicts should adopt some other system of getting the beat note.

If other receivers of this type work as this one does, no audio amplification will be required for headset reception. Indeed, liberal use of the r.f. gain control is necessary to keep signals at a comfortable level with the 'phones in the detector output circuit. Therefore, if an audio stage is to be used, let it be a power stage working into a loud

It has been our habit, in presenting an unusually meritorious technical contribution, to include some few words of conservative editorial comment and approval. Our aim has been, of course, to supplement the author's own judgments and views with what we consider to be the "inside dope." In instances where the material was in treatment of obviously important but relatively untried technical advances, we have made a particularly sincere effort to avoid hasty judgments. We believe we have erred, if at all, on the side of conservatism. For that very reason we have, until now, avoided an emphatic editorial opinion on the "Single-Signal" receiver. At this juncture, however, the coast is clear. Extended experiment with this most recent of Jim Lamb's creations has left us with the firm conviction that it is really the set about which we have dreamed all these years. It may seem complex and relatively costly in this, its first version. But those things are really secondary in view of its accomplishments. We are convinced that the receiver is at least the basis of the ultimate high frequency receiver of this era.

— EDITOR

speaker. Here the constructor can follow his pleasure. We found a single 46 with low- μ Class A connection quite satisfactory, although a '45 or a '47 pentode could be used as well. The detector output is even sufficient to warrant a push-pull Class A stage using a pair of 46's or '47 pentodes,



THE RELAY-RACK MOUNTED MODEL OF THE S.S. RECEIVER IN THE QST LABORATORY

The controls of the high-frequency and i.f. filter unit are at the top, the large dials being r.f.-detector tuning (left) and h.f. oscillator tuning (right). Between these is the selectivity control. The small dial at the upper right is for the oscillator padding condenser and below it is the knob of the oscillator coil switch. The knob at the extreme left is the antenna trimmer adjustment. The lower controls are, left to right, manual-automatic gain switch, manual r.f. gain, audio gain, tone control, and beat-oscillator switch. Above and to the right is the oscillator beat control. The 'phone jack is to the right of the tone control and tip-jacks for power stage output are at the left, below the detector plate milliammeter. As is pointed out in the text, several of the controls can be eliminated.

The mechanical construction is the work of QST's laboratory assistant R. B. Parmenter, better known to hamdom as chief operator "RP" of W1MK.

because a single one of either type gets more than ample excitation even on moderate signals. The choice of output transformer will depend on the impedance requirements of the type of tube used and the loud-speaker load into which the power stage is to work. The secondary of the 1-to-1 transformer used in this case is coupled either into the primary of an RCA 106 speaker's transformer — or into the grids of a pair of 46's Class B when the urge is felt for 25 watts or so of audio output!

The controls with which this receiver is equipped are not all absolutely essential, by any means, but are incorporated because the receiver is to be used for experimental work that makes them helpful. The audio gain control and tone control can be omitted, for instance. Likewise, the switch

for optional manual or automatic gain control is unnecessary if only manual control is to be used. Excepting these, the only panel controls of the whole receiver that are essentially additional to those found on usual 'phone-c.w. superhets are the selectivity control and beat-note control on the i.f. oscillator. The absence of selectivity and beat-note controls on other receivers is their handicap, however, as a few minutes of comparative operating immediately demonstrate.

MECHANICAL FEATURES — SHIELDING

As has been mentioned previously, this unit goes beneath the first unit of the receiver, bringing the output lead from the i.f. filter down in the left rear corner. Therefore, as viewed from the front, the line-up (first i.f., second i.f., second detector) progresses from left to right along the rear of the base, the modulating oscillator compartment being at the extreme right and the audio equipment having place in the foreground. The general plan is illustrated in the top view. When contemplating this picture remember that it is taken from the rear and that everything is reversed right-for-left as compared to the other views. The schematic diagram of Fig. 1 follows more or less faithfully the actual line-up of the unit. All the components are identified in the top and bottom views, for the benefit of those who like to know just where every item is placed — not that exact placement is something terribly important.

The $\frac{1}{8}$ -inch thick aluminum base is of generous size, 16 by 10 inches, to allow for ample spacing between components and room for subsequent additions, such as separate automatic gain-control tube, etc. Its front and rear edges are bent down to form a 1-inch deep sub-base space. This space is completely enclosed by the $\frac{1}{16}$ -inch thick bottom plate. The ends of the latter are bent up to give a tight fit and it is fastened by 6-32 machine screws threaded into tapped sections of square brass rod which, in turn, are screwed to the base along the front, rear and sides. Such complete shielding of the sub-base region is recommended.

Thorough shielding of the i.f. beating oscillator and of its connection to the plate of the second detector is also important. Hence the whole oscillator is enclosed in an aluminum box $3\frac{1}{2}$ inches wide by 7 inches by $5\frac{1}{2}$ inches high. Further shielding of the oscillator's tuned circuit is provided by the cylindrical aluminum can (coil shield type) within which are contained the oscillator inductance, L_{11} , padding condenser, C_{11} , grid condenser, C_{17} , and grid leak, R_{11} . A close-up shows this assembly with the shields removed. A similar can, between the oscillator compartment and the second detector, contains the oscillator-detector plate choke and the low-pass filter in the detector output circuit. The sub-panel socket of the detector is also shielded.

The logic behind all this shielding is that without it the oscillator's output most certainly would leak into the preceding circuits, particularly the i.f. amplifier grids, and cause damaging overloading all down the line. The shielding is backed up by somewhat unusual circuit features that will come later. Further than our fondest hopes, the net result of all these precautions is that there is not a noticeable trace of oscillator signal anywhere except in the detector circuit where it belongs. In actual performance this means that the oscillator can be tuned smack on i.f. resonance and that any signal, no matter how strong, can be heterodyned to give any desired beat note from a few cycles per second up, without trace of blocking or "pulling in." Of course the one-way coupling out of the oscillator contributes no little to this unusual stability. This beat action is no less an asset to the receiver's all-around performance than the other features that have been emphasized.

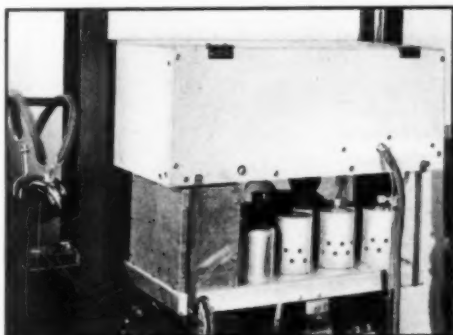
As in the pre-r.f. and first detector of the upper unit, the 58 tubes of the i.f. stages and the 56 second detector have their individual shields as has each of the i.f. transformers and plate feed chokes. R.f. leads are shielded as indicated on the schematic diagram, the Belden shielded cable specified in the previous article serving.

The r.f. gain, audio gain and tone controls are mounted on a small sheet-aluminum panel that is fastened to the base with a pair of angle brackets, their shafts projecting through the main panel that fronts this unit and the one above. A flexible coupling connects the shaft of the midget beat-control condenser to an extension running to the midget vernier dial on the front panel. The insulated 'phone jack, switches, audio-output tip jacks and milliammeter are also mounted on the main panel, which is of $\frac{1}{4}$ -inch aluminum and is $21\frac{1}{2}$ inches wide and 14 inches high. The width is slightly greater than the usual relay-rack dimension simply because the rack on hand happens to be slightly off standard. The i.f. unit base is screwed to the front panel and supported from the upper unit at the back by a pair of brass hanger strips. The high-frequency unit is supported entirely on the panel and $\frac{5}{8}$ -inch back from it by brass angle strips secured to the sides of the cabinet and to the front panel. The whole assembly is exceptionally sturdy and rigid.

CIRCUIT DETAILS

As Fig. 1 shows, the circuit is not unusual until the second detector is reached. The i.f. transformers are of the double-tuned type with compact "Diamond Weave" primaries and secondaries of Litz wire. The tuning condensers are of the adjustable mica type with a maximum capacity of 70 μfd . Primary and secondary windings are identical, their inductance being approximately 1 millihenry. Standard i.f. transformers

(approximately 1.2 millihenries) for 465-kc. i.f. can be used as well. Here again, as in the i.f. filter, solenoid-wound transformers might be used, although they will be quite bulky and more difficult to shield. It is also difficult to make them up so that primary and secondary inductances are equal. Such equality is a desirable feature with



THE RECEIVER ASSEMBLY VIEWED FROM THE REAR

double tuning and the use of the type illustrated is therefore recommended. If the i.f. transformers must be made up, however, they can be wound to the specifications given for the i.f. filter input transformer in last month's article. It would be advisable to tune only their secondaries, using either the adjustable mica type or 100- μfd . (midget variable) air-type condensers, even though the single tuning gives less selectivity and gain. Mention of the midget condensers reminds us that air-condenser tuning of i.f. transformers of future design is quite likely to become common. The adjustable mica type, by their very nature, leave something to be desired in the way of permanency of capacitance with mechanical jarring, humidity variation and temperature changes. They ought to have occasional readjustment, just as a matter of precaution.

As in the other unit, grid-return and screen-grid feed circuits are equipped with decoupling resistors, and plate-feed circuits have their r.f. chokes. These are even more essential in the i.f. than in the h.f. circuits because of the higher gain and greater probability of instability at the lower frequency. Decoupling is also a feature of the a.f. amplifier grid circuit.

The detector, it will be noticed, has a cathode bias resistor of 50,000 ohms and has a peculiar looking plate circuit. The high bias resistance makes the detector capable of handling larger signals without overloading than it could with something around 20,000 ohms (which was first tried), and does not noticeably reduce sensitivity.

Passing on to the plate circuit, its unusual appearance is explained by the plate-modulation method used to get the heterodyne beat note for

c.w. reception, as originally proposed in June QST. The system is actually a sort of Heising modulation. Instead of by-passing the usually useless rectified r.f. components in the detector output directly to ground, they are applied across the "modulation choke," L_{25} , along with the output of the i.f. heterodyne oscillator. The broadly resonant choke has considerable reactance to the harmonic as well as to the fundamental r.f. components from these two sources, so that the resulting audio-frequency note is made up not only of beats between the two rectified fundamental radio frequencies but also of beats between a series of appreciably strong r.f. harmonics. Hence

the signal as heard is full and "natural" sounding, in contrast to the "thinness" of the nearly pure tone obtained with audio-frequency filtering methods. The other choke, L_{10} , and the two by-pass condensers, C_{25} and C_{26} , make up the customary low-pass detector plate filter, necessary to keep the now useless r.f. from getting into circuits where it is not wanted. Plate feed to both detector and beat oscillator is through the common filter and modulation chokes — and through the a.f. transformer primary or headset. The oscillator plate current is only 1 ma. or so, however, and therefore is inconsequential insofar as the transformer windings or 'phones are concerned.

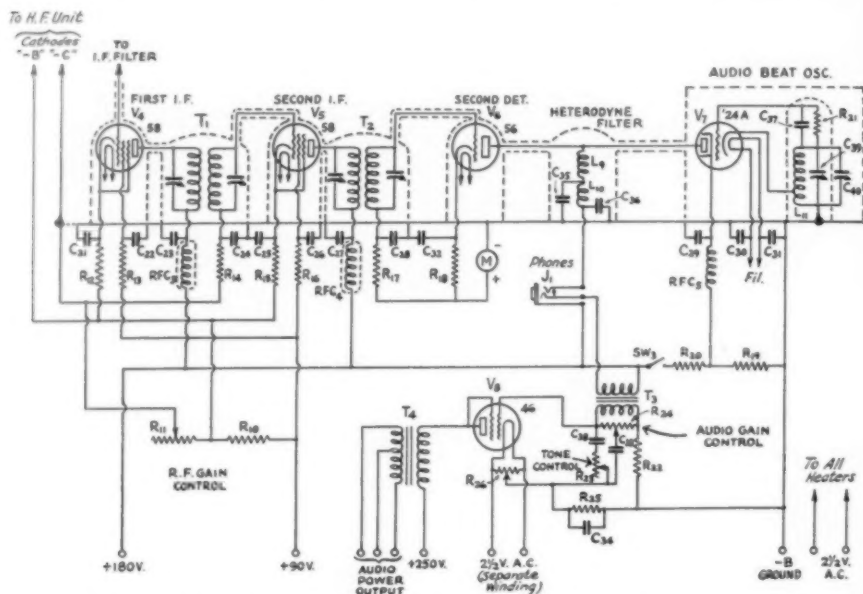


FIG. 1 — CIRCUIT AND SPECIFICATIONS FOR THE I.F. AND AUDIO UNIT

The designations continue from Fig. 3, August QST

L_{10} , L_{11} — Detector plate-modulation and filtering inductances. Broadcast-band or long-wave type r.f. chokes. (Silver-Marshall No. 276.)

L_{11} — I.f. beating oscillator inductance, 110 microhenries. See text.

C_{21} to C_{24} inclusive — 0.01- μ fd. mica by-pass condensers. C_{25} , C_{26} — Audio by-pass and coupling condensers, 1.0- μ fd. 250-volt paper type.

C_{25} , C_{26} — Detector plate-filter condensers, 250- μ fd. small mica type.

C_{27} — I.f. beating oscillator grid condenser, 250- μ fd. small mica type.

C_{28} — Tone-control circuit condenser, 0.01- μ fd. mica type.

C_{29} — Oscillator padding condenser, 0.001- μ fd. adjustable mica type (Hammarlund MICS-1000).

C_{30} — Oscillator beat control, 50- μ fd. midget.

R_{10} — R.f. gain-control circuit bleeder, 100,000-ohm 1-watt.

R_{11} — R.f. gain control, 2000-ohm tapered type variable resistor.

R_{12} , R_{13} — I.f. amplifier cathode resistors, 300-ohm 1-watt.

R_{14} , R_{15} — Screen-grid resistors, 5000-ohm 1-watt.

R_{16} , R_{17} — Grid-circuit isolating resistors, 250,000-ohm 1-watt.

R_{18} — Detector cathode resistor, 50,000-ohm 1-watt.

R_{19} — Oscillator voltage-divider resistor, 10,000-ohm 1-watt.

R_{20} — Oscillator voltage-divider resistor, 50,000-ohm 1-watt.

R_{21} — Oscillator grid leak, 100,000-ohm 1-watt metallized type.

R_{22} — Audio decoupling resistor, 500,000-ohm 1-watt.

R_{23} — Tone-control variable resistor, 200,000-ohm tapered type.

R_{24} — Audio gain control potentiometer, 500,000-ohm tapered type.

R_{25} — Audio amplifier cathode bias resistor, 1500-ohm 1-watt.

R_{26} — Filament center-tap resistor, 20-ohm.

T_1 , T_2 — I.f. transformers. See text.

T_3 — Audio coupling transformer, 3 to 1 ratio.

T_4 — Output transformer. See text.

RFC_1 , RFC_2 — Shielded r.f. chokes. Same as RFC_3 .

RFC_3 — 85-millihenry r.f. choke, unmounted type.

SW_1 — S.p.s.t. beat-oscillator switch.

J_1 — Single circuit-closing jack with both leaves insulated from frame.

M — Resonance (tuning) indicator, 0-1 or 0-1.5 milliammeter.

The filament winding for the audio tube should be separate from that used for the other tubes. The same "B" supply may be used for both units of the receiver. The total "B" current drain is approximately 40 ma. at 180 to 225 volts for all tubes prior to the power stage, the latter taking approximately 25 ma. at 250 to 300 volts.

C_{15} of Fig. 3 in the preceding article is a 70- μ fd. (max.) adjustable mica condenser (Hammarlund MICS-70).

A 50- μ fd. midget air condenser could be used.

The no-signal detector plate current is approximately $\frac{3}{10}$ ma.

The plate circuit of the oscillator is, of course, effectively in parallel with the audio-frequency output circuit of the detector. With approximately 200 volts on the plate and 1 ma. oscillator plate current, the effective shunting resistance as viewed from the detector is around 200,000 ohms. This does not materially affect the audio output of the 56 second detector but would be appreciably low for a detector tube calling for high load impedance — one reason why the 57 screen-grid detector is not advisable. The shunting resistance is practically infinite when the oscillator screen voltage is cut off by SW_3 , as for 'phone reception. There may be some objection to the detector plate loading imposed by the oscillator, from those who favor screen-grid detectors and hence cannot tolerate several hundred thousand ohms shunting the normal detector output. But the alternative method would be to introduce the heterodyne in the grid circuit which, in an audio-frequency detector, would mean tricky coupling. On the other hand, the tolerance of the plate method is remarkable. No coupling adjustment is required. The oscillator output can be crudely controlled by varying the oscillator screen voltage, which can be anything between 45 and 90 volts without materially affecting the results. Undoubtedly there is some coupling to the detector grid circuit even with the plate heterodyne system but it is through the plate-grid capacity of the tube — and that coupling is pretty well fixed! It will be noticed that such tolerance

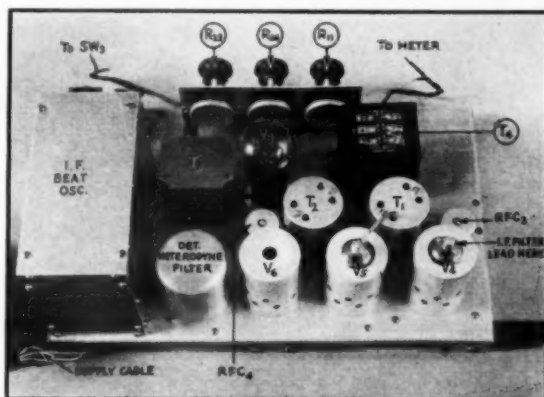
and signals of different "character" are not all satisfied with the same beat note. Then too there are slight changes in i.f. resonance frequency with switching of the i.f. filter, necessitating occasional readjustment of the beating oscillator. A change in beat note from time to time is also restful to the ears, as every operator knows.

The coil of the oscillator, wound on a midget form like those used in the h.f. oscillator, has the following specifications:

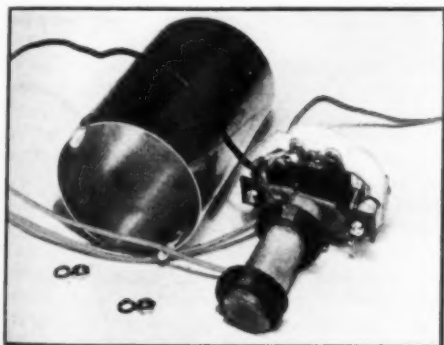
- Diameter of form, 1 inch (bakelite tube)
- Length of coil, $1\frac{1}{4}$ inch
- Size of wire, No. 28 s.s.e., No. 30 d.s.e. or No. 34 d.c.e.
- No. of turns, 90
- Approximate inductance, 110 microhenries
- Cathode tap, 30 turns from "ground" end

For oscillator output frequency to give an audio beat note with a 525-ke. intermediate frequency, the padding condenser C_{30} will have approximately 800- μ fd. capacity and the 50- μ fd. midget variable in parallel will give a variation in beat note frequency from zero to 10,000 cycles or so, either side of the "zero" center setting of this condenser.

Passing to the input circuit of the audio power stage, the audio gain or volume control has its rotor connected to the filament center-tap, through the 1- μ fd. coupling condenser. This is somewhat more satisfactory than the usual rotor connection to the grid, eliminating squealing caused by hand capacity to the shaft. To eliminate bias circuit noise caused by microphonic contact between the rotor and resistance element, the bias is fed through the 500,000-ohm



PLAN VIEW OF THE I.F.-AUDIO UNIT FROM ABOVE

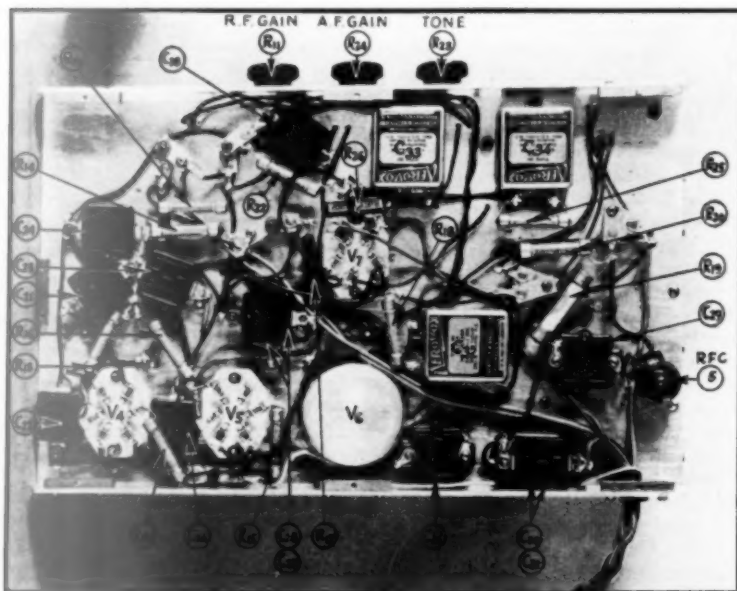


COILS AND TUNING CONDENSERS OF ONE OF THE I.F. TRANSFORMERS

is a characteristic that has been kept in the foreground throughout the design of the whole receiver.

The high- C tuned circuit of this oscillator, contained in the cylindrical inner shield, consists of a 110-microhenry inductance and a 0.001- μ fd. maxi-

decoupling resistor R_{22} and thence to the grid by way of the transformer secondary and gain-control resistance in parallel. If the rotor of the gain control is not insulated from the shaft, then the shaft should be insulated from the metal panel.



WITHIN THE SHIELDED SUB-BASE REGION OF THE I.F.-AUDIO UNIT
The socket marked "V₁" should be "V₆."

The tone control circuit is simply a variable resistor, R_{23} , in series with a 0.01- μ fd. fixed condenser, across the input circuit. Decreasing the resistance of R_{23} progressively cuts down the high-note response. This control has been found only occasionally useful with this receiver and may be omitted. The audio gain control also may be omitted, since manual control of the r.f. gain is already provided, although audio control is useful with some systems of automatic r.f. gain control. The auto-gain feature, to be described in a future article, is very helpful for 'phone reception but is a liability rather than an asset for c.w.

When all the wiring has been completed it is recommended that the various circuits be tested for continuity and shorts before the plate and filament power supplies are connected. The best instrument for this purpose is an ohm-meter or, alternatively, a high-resistance voltmeter and "B" battery. Plate circuits should be tested for continuity from plate terminal of each socket to "B plus" supply terminal, grid circuits from socket to "-C" or ground, etc. It must be kept in mind that those circuits containing resistors, chokes, etc., should show resistance of the proper value, several hundred ohms for r.f. chokes, some thousands for the various resistors, and so on. If a circuit that ought to have such resistance shows

dead short, then look for the defect. In this connection the recommendation is offered that each component be tested before it is wired in. A shorted or leaky condenser, for instance, is much more easily detected before assembly than afterwards — and some-

times even new components are imperfect.

When these tests have been completed, put the tubes in their sockets (they will have had their acceptance test, too) and connect up the power pack. There should be two 2½-volt filament supplies, that for the audio stage being separate from the other. A single "B" supply, with a divider to give the various voltages, may be used for both receiver units. There should be no evidence of hum in the receiver's output if the "B" supply is up to the usual standard.

Although the i.f. stages might be lined up on a signal coming

through from the high-frequency end, the process would be very much like that of trying to open a safe without knowing the combination. It is much better in every way to generate a local i.f. signal and do the lining up with the h.f. unit disconnected. This local signal may be obtained quite easily. Either rig up an oscillator using the i.f. filter crystal or, if there is no crystal, use the i.f. beat oscillator of the receiver. To use the latter, disconnect the detector plate lead from the top terminal of L_2 and temporarily connect it to the junction of L_2 and L_{10} . Then bring out an insulated lead from the top terminal of L_2 , thus making connection to the oscillator plate circuit. Set the nearby broadcast receiver to the low-frequency end of its tuning range and adjust the capacity of the beat-oscillator padding condenser (using a screw driver) until the signal shows up on the b.c. receiver. This can be detected by the characteristic "rush" of the carrier heard either side of resonance on the receiver.

Now couple the lead from the oscillator plate to the grid of the second i.f. tube by looping the insulated wire around its control-grid lead, near the grid terminal on top. Then, with an insulated screw driver, adjust the primary and secondary tuning condensers of the i.f. transformer, T_2 ,

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starting with both at maximum capacity (screwed all the way to the right) and backing off a half-turn or so at a time, first on one and then on the other. Resonance will be indicated by maximum deflection of the detector plate meter and, in the 'phones, by the characteristic "rush" either side of the middle silent region. As resonance is approached it may be necessary to reduce the coupling to the oscillator, by moving the coupling lead farther from the i.f. grid, or to reduce the signal reaching the second detector by backing off the r.f. gain control. Most precise i.f. tuning will result with least possible signal input. When the second stage has been lined up, the coupling lead should be transferred to the grid of the first i.f. tube and the procedure repeated. Complete alignment of the two stages actually can be accomplished in no more time than it has taken to describe it.

The procedure with the crystal-controlled oscillator is similar. The detector-beat oscillator connections are left undisturbed, of course, and the insulated lead is coupled from the crystal-oscillator plate circuit, perhaps through a small fixed condenser, first to the grid of the second i.f. tube and then to the grid of the first i.f. tube. That's all there is to that.

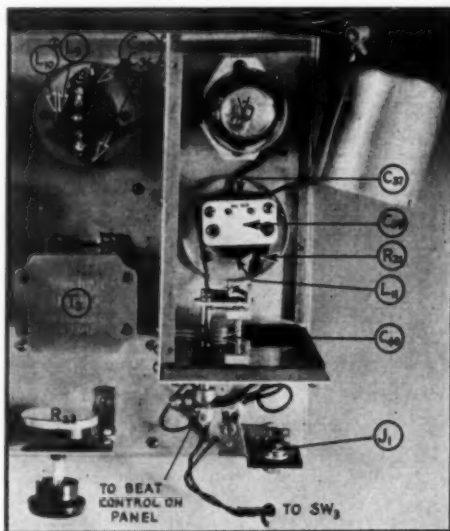
When the i.f. transformers have been lined up, the lead from the i.f. filter is clipped on to the grid of the first i.f. stage. If the first unit has not been tested out with a broadcast receiver serving as the i.f.-audio unit, as suggested last month, the procedure described in that article should be followed with the new i.f.-audio unit in operation. After checking on a few 'phone signals or modulated c.w. commercials, the i.f. beat oscillator (with plate filter connections restored) can be switched on and tuned up by setting the beat-control dial at mid-scale and adjusting the padding condenser until the oscillator frequency is in zero beat with the i.f. signal. From this point on the adjustments for off-set tuning without the crystal filter and for maximum selectivity with the "Series" crystal-filter connection are the same as described in the preceding article, to which the reader is referred.

OPERATION AND PERFORMANCE

Tuning of the receiver is no different from that of ordinary superhets, of course, and is no more complicated than that of a regenerative receiver. In some respects it is less involved than tuning of the latter because there is no critical regeneration control to bother about. The oscillator adjustment is the "sharp" one. The pre-amplifier and first detector tuning being relatively broad, its adjustment simply follows that of the oscillator. Single-control tuning was not called for in this receiver — because then flexibility would be loosened and but one band could be covered with each oscillator coil — although it could be worked in with no great difficulty. But the receiver's

general utility would be limited to tuning ranges for which sets of coils had been made up before the builder's ambition ran out.

The selectivity control is perhaps the most interesting operating feature and one making his first acquaintance with it can expect some hours of fascinating discovery. Although it might be thought that there are few ham signals steady enough to warrant use of the series filter connection for c.w. reception, experience shows that it is useful for something like 80% of all c.w. signals, including the better "r.a.c." variety. The range of selectivity available by simply adjusting the



CLOSEUP OF THE I.F. BEAT OSCILLATOR AND DETECTOR PLATE FILTER WITH SHIELDS REMOVED

selectivity control is adequate to accommodate a surprisingly wide variety of signal types.

The character of any signal except already perfectly steady d.c. is actually improved by the process of reception. The receiver tries to make "crystal d.c." out of everything it gets hold of. A peculiar characteristic of the series filter is that in the setting of the selectivity control there are two regions of high selectivity, one either side of a middle broader region. It would seem that the less selective adjustment comes at filter input resonance with the crystal's natural frequency, while increasing selectivity occurs when the reactance of the input circuit becomes inductive or capacitive for resonance frequency. It is probable that a low- L (high- C) secondary on the input transformer would make this otherwise. The "optimum" selectivity adjustment for this receiver is with the selectivity-control tuning condenser capacity slightly greater than at the "broad" setting.

Along with its remarkable ability to untangle signals on closely adjacent frequencies, the receiver also has the ability to reduce background noise caused by electrical machinery, etc., as well as to make a helpful dent in natural QRN. This would be expected as an accompaniment of high selectivity. The elimination of background is especially noticeable on the 14-mc. band where automobile QRM is notorious. As an illustration of what the background reduction amounts to, the racket from a running Dictaphone motor, sufficient to put out of the running anything but a wallop signal on an ordinary regenerative set or even on this receiver as a straight superhet, is practically inaudible with the series filter at maximum selectivity—and signals ordinarily undetectable are made perfectly readable. Any

from spurious sidebands kilocycles off the normal channel space a 'phone should occupy. Frequency modulation of even a few cycles is shown up with the i.f. beat oscillator switched on and zero-beat with the carrier.

This model of the s.s. receiver is now getting its field trial at W1MK, a tough spot for receiver testing if there is one anywhere. No doubt, "RP" will have some interesting dope on performance under heavy traffic duty—for a future issue of *QST*.

Midwest Division Convention

(Continued from page 8)

A most sincere invitation is extended to the ladies, and special entertainment will be provided for them. Remember the dates, and send in your reservation to W. A. Beasley, Secretary, 1451 Byron Ave., Topeka, Kansas.

Western New York-Atlantic Division Convention

(Continued from page 8)

place during the New York State Fair and many interesting visits arranged for during the two days of the convention. Get in the first day so as not to miss anything, especially an initiation of the Royal Order of the Wouff Hong, the secret fraternity of amateur radio.

Best of all is the price,—only \$2.50 for the registration to the two days of real hamming. A word to Don Farrell, Convention Manager, 213 Hickok Ave., Syracuse, N. Y., that you will be present, will all make us feel good.

Another Eclipse Opportunity

MR. DALE POLLACK, W2AEC, Care Mr. J. H. Logan, Furnald Hall, Columbia University, New York City, requests the cooperation of amateur experimenters in the following manner, during the eclipse of August 31st.

A vacuum tube voltmeter (such as described, page 128, 9th edition *Radio Amateurs Handbook*) is the most suitable instrument to use in connection with almost any radio receiver in making measurements on signals just before, during, and after the eclipse. *Relative signal intensity* will be of greatest interest, and any method to show this will produce interesting results. It is not even necessary that the v.t. voltmeter be calibrated. Receiver output, or volumetric read-

(Continued on page 20)

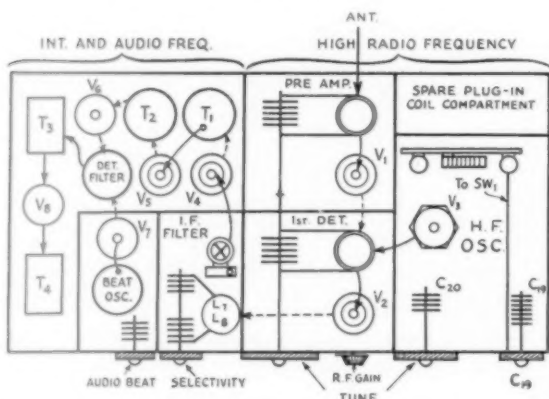


FIG. 2—A SUGGESTED PLAN FOR A SINGLE-DECK MODEL
The outside dimensions need be no greater than 26 inches wide, 12 inches deep and 7 inches high.

ham in a noisy location can appreciate what this means.

The "Parallel" filter connection has been found most suitable for 'phone and s.w. broadcast reception. Here again the selectivity control does things to make the receiver's characteristic match the conditions encountered. An especially interesting experience is that of taking out the heterodyne interference caused by a carrier within a kilocycle or so of the desired signal's frequency. Precise tuning of the high-frequency oscillator does the trick, provided the interfering signal is sufficiently stable to stay in the notch (Fig. 4, page 17, August *QST*), and provided the mistake is not made of eliminating the carrier of the desired station instead of the unwanted one!

As a by-product, the all-around stability of the receiver and freedom from "pulling-in" effects make it the best monitor for both 'phone and c.w. transmitters that we have ever used. Over-modulation, either upward or downward, is revealed by upward or downward kicking of the detector plate milliammeter—and by the "burps"

Thirty-Three Watts Per Dollar from a Type '52

How to Get High Output with Efficiency and Safety

By Charles D. Perrine, Jr., W6CUH*

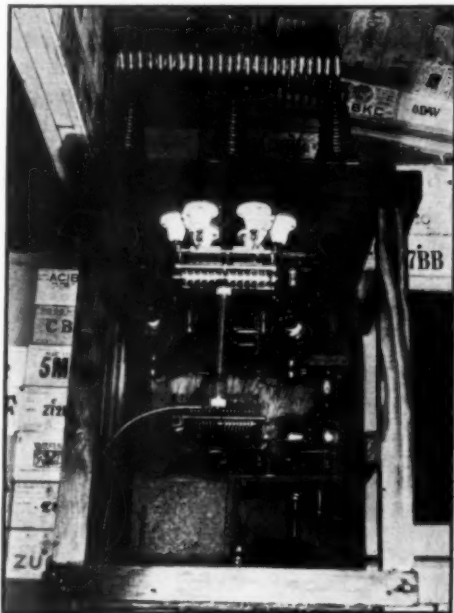
A TYPE '52 running cold on 1000 watts input — such was the thought that flashed through our minds as we re-checked the input and carefully watched the precious bottle for the least flush of excitement. On a dollars and cents basis this means over 33 watts of useful output per dollar invested in the tube, the power in the antenna being well over 800 watts. This is of prime interest to every red-blooded amateur, whether he is bent on making the best use of the 1-k.w. input allowed him by the F.R.C., or whether he applies these principles to his present station with increased efficiency in view.

What ham has not always desired higher power! And when higher power is coupled with high efficiency we have a much greater achievement. This brings us to the usual idea that more power in larger tubes — '04-A's, '61's, etc. — but these days such bottles are in a class with last year's "Packards"; we're driving "Chevvy's" now and getting there just as well.

Needless to say, this article will probably cater to the more advanced amateur. Therefore, the subject matter will be treated accordingly, with plenty of room left for exercise of the individual's own ingenuity. Two final amplifier designs will be described, the push-pull arrangement being treated in greater detail simply because the larger part of the development work was done with this set-up. The single-ended amplifier was only tried in order to determine the maximum capabilities of one Type '52. A medium-power tube, such as the Type '52, can handle all the power allowed by law when operated at maximum efficiency; no doubt the larger tubes will give the same output with less coaxing, but in doing so they will not have reached their point of highest efficiency. Any electrical device displays its highest efficiency at full load; therefore the Type '52 appears to be the best tube for inputs up to 1000 watts since it will operate at that input with over 85% efficiency on 7.2 mc., combining safety and long life. The attainment of the necessary high efficiency comes from attention to three general factors.

The three points are: operation at a high plate voltage, high excitation and high $L-C$ ratio. The high voltage, 4500 volts, enables one to run the input up without recourse to excessive plate currents, and at the same time materially increases the efficiency of the tube. It is evident that only tubes of the Type '52 construction

can successfully stand this voltage. The excitation must be high in proportion to the output, because with a kilowatt input we cannot expect one '52 to produce excessive gain efficiently. The grid bias must be high to correspond to the excitation. Further efficiency is gained by the use



THE EXCITING AND OUTPUT STAGES OF THE HIGH-EFFICIENCY TRANSMITTER

The tubes of the final stage are mounted base-up under the top deck, with the neutralizing condensers between them. The output tank condenser is in the foreground and the inductance on the roof. The '52 of the exciting stage is immediately below, also inverted, with its tank condenser to the left. The neutralizing condenser for this stage is in front of the tube. Performance is attested by the QSL wall paper of the shack!

in the plate tank of an extremely high $L-C$ ratio in order to keep all losses from circulating currents as low as possible; in fact, only enough capacity is used to tune the tank. These principles may sound simple, yet they require practical considerations which will be further described.

THE PUSH-PULL SCHEME

We will confine ourselves to the final amplifier and the preceding stage, for the remainder of the set-up is of little interest here. Of course, the Type

*40 21st Street, Hermosa Beach, California.

'47 feeding the exciting stage must furnish sufficient excitation. In this case the pentode is supplied with 500 volts and always operates on the output frequency. The complete circuit of the two stages is given in Fig. 1. The use of three Type '52's is very desirable because they can all operate at one voltage; a Type '03-A in the exciting stage would require a voltage dropping

between the plugs; otherwise the high r.f. voltage present will break down the hard rubber.

The two tuning condensers, C_1 and C_2 , are rebuilt Cardwells type T-183 and T-199 respectively. They are made two-section, doubling their breakdown voltage. This is especially necessary in the final stage where a four-inch

may be drawn from the condenser with 850 watts going into the antenna! The stator is the only part changed. It is cut into two parts such that the total number of plates in each half of the resulting condenser is equal. This necessitates the removal of the center stator plate in both condensers, and the further removal of one stator end plate in the T-199. The removal of the center plate leaves half an inch between the two resulting stator sections, a safe clearance. To preclude any possibility of breakdown, the hard rubber insulation was eliminated. Each half of

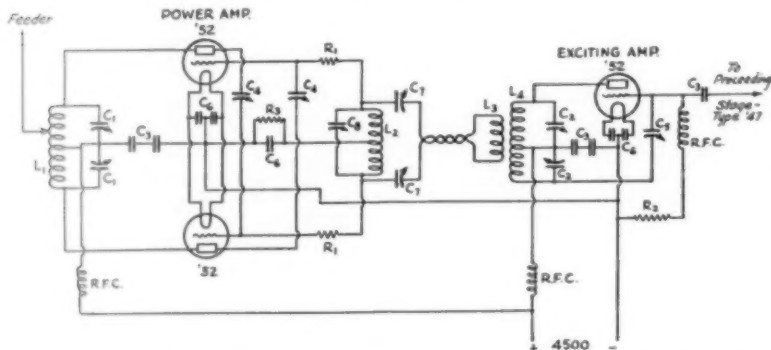


FIG. 1 — COMPLETE CIRCUIT DIAGRAM OF THE EXCITING AND PUSH-PULL STAGES

- L_1 — $\frac{1}{4}$ " copper tubing, 4" dia. — 24 turns for 7200 kc., 14 turns for 14,400 kc.
- L_2 — No. 12 enameled wire, 2" dia. — 30 turns for 7200 kc., 18 turns for 14,400 kc.
- L_3 — No. 14 enameled wire, 1" dia. — 10 turns for 7200 kc., 7 turns for 14,400 kc.
- L_4 — No. 10 enameled wire, 2" dia. — 28 turns for 7200 kc., 16 turns for 14,400 kc.
- C_1 — 25- μ fd. rebuilt Cardwell Type T183. See text.
- C_2 — 80- μ fd. rebuilt Cardwell Type T199. See text.
- C_3 — .002- μ fd. 5000 volt mica type.
- C_4, C_5 — Neutralizing condensers. See text.
- C_6 — .022- μ fd. receiving type.
- C_7 — 100- μ fd. 3000-volt.
- C_8 — 25- μ fd. 3000-volt.
- R_1 — Parasitic suppressors, 2 ohms.
- R_2 — 60,000-ohm 100-watt.
- R_3 — 15,000-ohm 200-watt.
- RFC — 150 turns of No. 30 enameled wire space-wound on a glass toothbrush holder.

resistor with a consequent loss of power. The push-pull final stage is admirably adapted to neutralization, and is well suited to the coupling arrangement joining it to the preceding amplifier. Another distinct advantage of push-pull is the balancing out of the even harmonics, especially the second, which would be very strong in the single-ended affair due to distortion of the output wave form with the unusually high grid bias. This is particularly important because our bands are not all harmonically related.

The excitation feed system is that used by Glaser, W2BRB, in his "Four-Band Kitchen Transmitter," but with one change. The Hi-C grid tank used for 'phone work has been replaced by a very Lo-C circuit in order to decrease losses and place a high r.f. voltage on the grids of the tubes in the push-pull stage. The twisted feedline permits smoother operation; it may be several feet long, thus allowing these two stages to be separated, decreasing chances of feedback. This arrangement provides flexible coupling and balanced excitation. The coils L_2 and L_4 are mounted on hard rubber strips and G.R. plugs for quick change. At least three inches should be allowed

between the plugs; otherwise the high r.f. voltage present will break down the hard rubber.

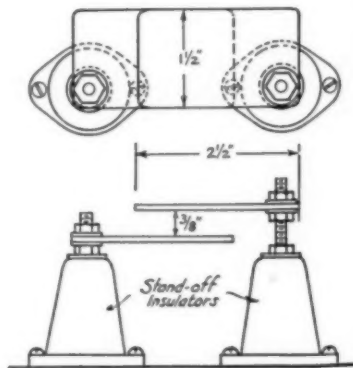


FIG. 2 — NEUTRALIZING CONDENSER DETAILS

similarly supported, and all three units of each condenser are mounted on a 7- by 10-inch wooden base. The photograph shows the final product.

Many amateurs have encountered difficulty in obtaining adequate neutralizing condensers. Either the condensers arced over or the insulation would go up in smoke. The solution of this problem is very simple. Each condenser consists of two rectangular $1\frac{1}{2}$ by $2\frac{1}{2}$ -inch aluminum plates. The edges of each plate are well rounded and polished. They are mounted as shown in Fig. 2. Adjustment is secured by rotating the plates about their supporting insulators. The spacing is sufficient to withstand the combined plate and r.f. voltages, there being no signs of breakdown to date.

Primary keying was chosen because of its many advantages. In the first place it completely eliminates key clicks, no mean achievement with powers of the order of a kilowatt. The filter condenser is relieved of excessive peak voltages, obviating the use of a bleeder resistor, itself a large item at a voltage of 4500. The effect on the line regulation will be increased, but then a separate pole transformer and line is practically a necessity with loads greater than one kw. The plate supply itself consists of a 2-kw. transformer delivering up to 4500 volts each side of the center tap, a 10,000-volt 10-amp. mercury arc with a conventional keep-alive system, and a 2- μ fd. 12,000-volt mica filter condenser. Two r.f. chokes in the 110-volt line to the plate supply make for clean keying. They consist of 100 turns of No. 12 enameled wire spaced the diameter of the wire, and wound on a four-inch cardboard tube. This simultaneous keying of the last two stages effectively prevents the appearance of a back wave.

Another distinct advantage of primary keying is that it allows the use of simple resistance bias. The use of batteries is practically out of the question due to the high bias voltage necessary, over 1000 volts in the case of the final stage. "C" eliminators may be used, but separate ones would be necessary for each stage because the high grid current of the final amplifier builds up the eliminator voltage to such an extent that all the preceding stages are badly over-biased even though they may be connected to a second voltage divider on the same eliminator. Use of an individual grid leak on each stage permits completely independent adjustment of the bias.

TUNING PRECAUTIONS

The process of tuning is little out of the ordinary except that greater care must be exercised. The exciting stage is neutralized in the conventional manner. Its tank circuit is first tuned up with 500 volts on the plate of the Type '52. The voltage should then be raised to about 3000, and L_4 coupled loosely to L_1 . The two feed condensers C_1 are adjusted simultaneously and first placed at about one-fifth maximum capacity. C_3 is then

adjusted until the plate current of the '52 shows a sharp peak. All these adjustments are then gone over until maximum excitation is obtained as shown by the grid current of the push-pull stage, to which filament voltage but no plate voltage has previously been applied. During normal operation at 4500 volts the plate current will be approximately 85 mils and the grid current of the final stage about 80 mils. With this input, the exciting stage furnishes sufficient excitation to enable the final amplifier to take up to 1000

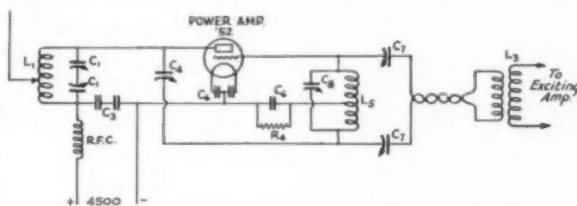


FIG. 3 — CIRCUIT OF THE SINGLE-TUBE FINAL STAGE
All constants are the same as in Fig. 1, except that R_1 is 40,000 ohms, and L_3 is 26 turns for 7.2 mc. and 14 turns for 14.4 mc.

watts input with the required high efficiency of 85%.

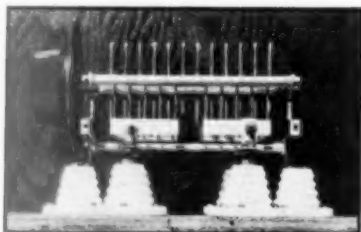
The last stage is neutralized in the usual push-pull fashion. As in the exciting stage, preliminary tuning is done with 500 volts on the plates. The antenna feed line should then be clipped on the tank coil about two turns either side of the center tap. Otherwise the application of full voltage to the Type '52's will cause the tank condenser to arc over despite its 12,000-volt rating. Slight readjustments may now be made throughout the set to gain maximum output. It should be remembered that with resistance bias the plate current of the final stage will rise when excitation is lowered; therefore this current is not a correct criterion of the output. An r.f. meter in the feed line is the best indicator in this case. When properly tuned the plate current will be about 225 mils at maximum input. At this "normal" 1-kw. input, the two tubes perform beautifully, with no signs of color even when the key is held down minutes at a time. This performance has been obtained on 3.6 mc., 7.2 mc. and 14.4 mc. with perfect ease.

The use of a single-wire feed antenna system with a push-pull stage in this manner may appear incorrect, but there is no real cause to worry. A correctly designed single-wire feed will only have the effect of pure resistance at the set end. Of course the shunting of this resistance across part of the inductance will change the impedance of that half slightly, but this effect seems to be negligible. The doublet antenna is theoretically correct for a push-pull transmitter, and has performed excellently on 7.2 mc.; but on 14.4 mc., the 7.2-mc. single-wire fed affair completely outperforms the doublet. Because of this advantage, the single-wire feed has been retained on 7.2 mc.;

incidentally, this same 7.2-mc. system is an efficient radiator on 3.6 mc.

USING A SINGLE TUBE

Our next step was to try a single Type '52 in the final amplifier. The eventual circuit arrangement was that of Fig. 3, the exciting stage remaining unchanged. This combination will no doubt appeal to all those who already possess a pair of Type '52's, as it allows an input of 1000 watts to the final stage on both 3.5 mc. and 7 mc., and 700 watts on 14 mc., with the plate remaining cold under keying. The same tuning precautions apply here as in the push-pull rig. The available excitation is somewhat more than that necessary for one tube; therefore care should be taken to see that the grid does not run more than a cherry red color. The maximum safe grid current seems to be 50 mils per tube; higher values may lead to grid emission and serious damage to the tube. This layout performed very well, but we personally prefer the push-pull rig because it allows the use of the full 1000-watt input on 14 mc., does away with the second harmonic, is easier to neu-



THE REMODELED TANK CONDENSER, SHOWING HOW THE STATOR AND ROTOR SECTIONS ARE INDEPENDENTLY SUPPORTED

tralize properly and possesses greater all around stability.

The result of all these experiments is that we obtained over 850 watts output from one "100-watt" tube on 7 mc. without seriously overstepping any of the Type '52's limitations. The plate dissipation obviously remains at a safe value, for the plate remains cold during keying — a situation to be found in very few transmitters using a Type '52 with an input of over 400 watts. As stated before, the grid temperature is also important. Now we come to the primary factor governing tube life, the filament emission. It may be noticed that the filament of the Type '52 is almost identical with that of the Type '03-A which is rated at 175 mils; therefore a 200 mil load should not have any dangerous effect on the Type '52's filament emission. The tubes used in this set are almost five years old, and have been right on the job with 1000 watts input for the past six months.

It is hoped that this information will create another incentive for the adoption of crystal

control, in high-power transmitters in particular. A self-excited oscillator could never approach the 85% efficiency of a well-designed amplifier of this type. Of course such high efficiency is largely made possible by the excellent performance of the Type '52, which may be truly termed the "Aladdin's Lamp" of amateur radio.

Another Eclipse Opportunity

(Continued from page 16)

ings on one given station should be taken every two minutes, for twenty minutes before the eclipse, during the eclipse (not totality alone, but during the partial eclipse also, and for twenty minutes after the eclipse. Mimeographed instructions will be furnished on application to the above address, if there is time to obtain this following publication of this notice about August 22nd.

Observations may be made on any c.w. station — also on 'phone stations, commercial high frequency broadcast stations (with comparison on a fairly distant low frequency broadcast station in the same locality on a separate receiver if time permits such arrangements), etc., when the microphone is silent. It is suggested that amateurs may make special schedules with other amateurs, one station to hold down the key (with call signal interspersed only at the 15-minute intervals as provided in F.R.C. regulations) while the other operator records measurements.

A complete report of such measurements should be sent to the Columbia University address given above, so that all data may be coordinated into a valuable report. Also A.R.R.L. will appreciate a copy of your reports or word concerning your participation in eclipse radio-tests of this nature.

Strays

From the sound of things some of the Young Squirts that are on the ether should be under it.

— W5NW

Silent Keys

It is with deep regret that we record the passing of these amateurs:

- A. J. Daniels, HK1AA-HKC, Bogota, Colombia
- William Ellingson, W7APV, Tacoma, Wash.
- Charles Newnan, W8GUT, Glenn, Mich.
- Luis A. Salice, LU5BO, Buenos Aires, Argentina
- Oliver A. Solberg, W9EJR, Essig, Minn.
- Corporal A. D. Williamson, W9HJV-W9ANR, Chicago, Ill.

Sticks That Have Stuck

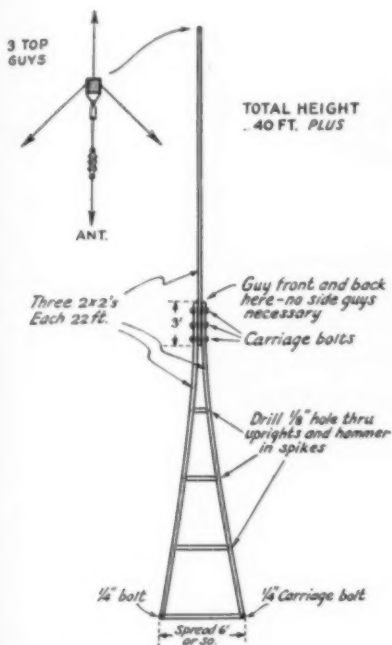
In Which the Headquarters' Gang, Contributing a Symposium on the Business of Mast-Building, Does Its Best to Determine the Ideal Sky-Hook

MAXIMUM strength, minimum weight, small wind resistance, good appearance and low cost—combine these with easy and safe raising and you have the qualifications for an antenna mast that any ham will find attractive. The sketch shows how we combined them for forty-foot plus masts at 9CEI and

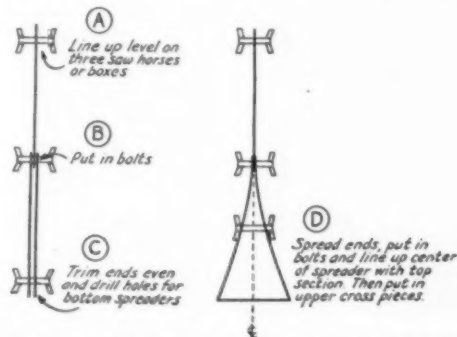
be any 56-mc. activity around the place), approximately 30 of them will be enough.

After visiting the local lumber emporium and personally supervising the choosing of the 2-by-2's, thus insuring knot-free and straight-grained pieces, set up three saw-horses or boxes and follow through as directed in the two figures. Artistic touches are the pointing of the top and the bevels blending the ends of the lower uprights into the rising center piece. Further artistic indulgence would be a couple of coats of "outside white" house paint. Even before this, however, doubting Thomases can satisfy themselves as to the easy handling by sticking the base against the side of a building and "walking" the mast up on end. A 120-pounder can do it readily.

After the second coat of paint is nearly dry (or entirely dry if you are a person of patience), attach the guys and rig the pulley for the antenna halyard. The pulley anchorage should be at the point where the top stays are attached so that the back stay will assume the greater part of the load tension. The load on the mast should be mostly compression—the secret of how skinny 2-by-2's do the trick. It is better to use wire wrapping around the stick, with a small through-



THE CEI "TWO-BY-TWO" MAST



ILLUSTRATING THE METHOD OF ASSEMBLY

CEI. Every bit of wood in the thing, all seventy odd feet of it, is 2-by-2 straight-grained pine (which a lot of retail lumber yards call their hemlock), or even fir stock. The uprights can be each as long as 22 feet (for a mast slightly over 40 feet high) and the cross-pieces are cut to fit. Four pieces of 2-by-2 22 feet long will provide enough and to spare. The only other materials required are five 1/4-inch carriage bolts 5 1/2 inches long, a few spikes, about 300 feet of No. 12 galvanized wire for the guys or stays, enough No. 500 ("egg") glazed porcelain strain insulators to break up the guys into sections and the usual pulley and halyard rope. If the strain insulators are put in every 5 feet (a good idea if there is to

bolt to prevent sliding down, than to use eye bolts. The latter weaken the thing. Straighten out the wires and halyard rope, making sure that the latter isn't on the wrong side of anything, and we are ready for the raising.

If the mast is to stand on the ground, just pound in a couple of stakes to keep the bottom from slipping and "walk it up." If it is to go on a roof, first stand it up against the side of the building and then hoist it, from the roof, keeping it

vertical. The whole assembly is light enough for two huskies to perform the complete operation — lifting the mast, carrying it to its permanent berth and fastening the guys — with the mast vertical all the while. It is therefore entirely practicable to put up this kind of mast on a small flat area of roof that would prohibit the erection of one that had to be raised vertical in its final location.

Once the base has been placed on its spot and made level right-and-left, the front and back guys from the mid-section are anchored so that the mast stands vertical fore-and-aft. The side-wise rigidity of the bottom section eliminates all other geeing and hawing — provided the base is level. The last step is to anchor the top guys so that the upper section lines up vertical. This can be done quite accurately by the straw-boss, sighting up from the bottom, while the enthusiastic helper clambers over the surrounding roof and gables, tightening and loosening guys as commanded. Then, up with the antenna — and all hands down to the shack to find out how she perks.

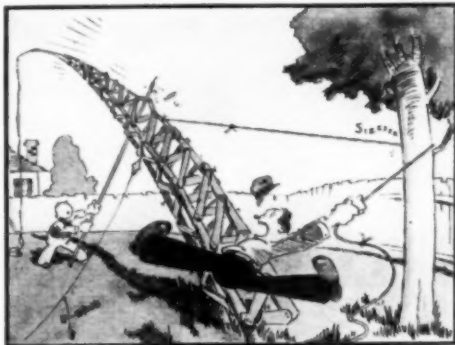
Since 1926 two of these masts have been erected, one at 9CEI, QRA then Michigan (City!), North Dakota, and one at 3CEI, Washington, D. C. Both carried long Zepp antennas with plenty of weight in the feeders. Both have gone through some pretty tough weather — the one in the West through sleet and snow storms that enlarged every wire and the halyards to half-inch size with ice, the one in the East through several heavy blows, one of them a young tornado. The bulk of the tension load is on the stays, mostly on the top-back one, and the load on the mast is all compression. Since good straight pine will stand approximately 1000 pounds per square inch with the grain in compression and some 100 pounds per square inch in shear parallel to the grain, there is little likelihood of a crash as long as the stays don't let go.

— J. J. Lamb, W1AL

A Lattice Mast

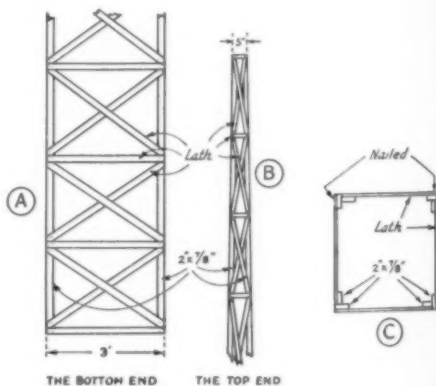
AW NERTZ! How do you expect me to remember the details of a mast we put up eight years ago? That was when the Kruse-Budlong-Mason-Beekley outfit had real ether-busters over at Silver Lane and when we thought 100 meters was awful short. Well — I remember the mast was 80 feet high. Incidentally, she still stands. I moved her with me once when I moved to a new house (six miles over a bumpy road —

butt end on a truck and top end weaving around on a pair of wheels half a mile or so behind). The next time I moved I left her behind — sold her on the hoof for six bucks — and she's now reduced to the ignominy of carrying just a single-wire music antenna. That's tough, after the weird contraptions she once supported; but she still looks pretty sweet. The black asphaltum paint we slopped on made her look like a steel tower. Here are some sketches which show construction.



We made up each of the four sides separately — using just rough 2" x 3/4" spruce or something for the uprights and common lath for the cross pieces (see A and B in sketch). Pretty near gave up in disgust at that point because each finished side was floppy as a piece of rag. You could pick up a side at the bottom and give it a shake and a wave would run right up it and the top end would

flip up. However, the flexibility was only in one direction. We nailed the sides together (see C in sketch), a nail in each corner each foot or so, and she was beautifully rigid. We hauled her up by tying down the bottom end and pulling a rope, fastened around her middle, over a branch of a convenient tree; with some assistance from



a few pike-poles. Oh — I forgot — it's necessary to put some criss-cross pieces inside (northeast to southwest and northwest to southeast in sketch C) or there is danger of her folding up. We realized afterward that to make her look really swell we should have laid the sides out so they were concave instead of straight — like the Eiffel Tower, I mean.

— F. C. Beekley

After all, masts is masts. They are just hunks of something to hold the sky wire above the ground. Now in these days we have found to our dismay that single-wire antennas work just as well as seven-strand wire used with hoop or cage antennas. I say dismay, for our antennas look like ordinary garden variety BC antennas instead of the old-time symmetrical spread of wires or the beautiful cage antennas of the early days. Those were the times when some attention was given antennas. They were not just dropped out the window or strung across the attic as they often are to-day. However, "them days" of many wires in the antenna are gone — but the day of height is still here — and if I'm going to have height I'm not going to do the cowardly thing of appropriating a convenient 60-foot elm tree. I'm going to build me a lattice mast just like Beek had in Silver Lane when I first came to Hartford. But I'm going to profit by his experience! The final product will be painted and every time I drive up to the house I'm going to get the old "pride of ownership" feeling out of the 80-footer. When I work that Asian station I have been trying to QSO for 8 years, and have the old WAC on the wall, I'm not going to be bamboozled into thinking that it was a flock of ideal conditions or power — it will have been the old sky wire that did it.

— C. C. Rodimon, W1SZ

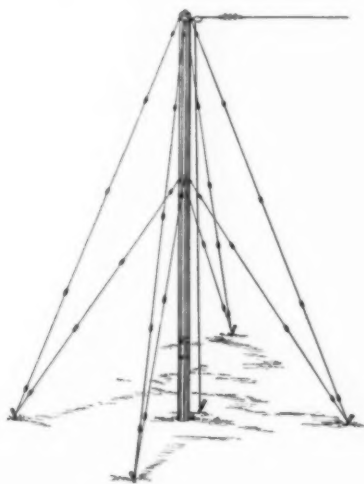
Telegraph Pole to Trees

WHEN W1ES was plain "AH" in 1908, his antenna poles consisted of two brick chimneys over brown stone house roofs on 123rd street, New York, some four stories above ground and 300 feet apart. The next big change was in 1914, when as 2ZH, in Nutley, N. J., while looking around for a "big" stick, a 65-ft. telephone pole was discovered lying in a horizontal position near the railroad bridge. While it had been condemned it was good enough for our purpose. It was very easy to talk a telephone crew into carting the stick and setting it up on a cold Thanksgiving Day. Since that time we have been satisfied with big trees and the present arrangement is a big walnut tree some two hundred feet away from the house.

— A. A. Hebert, W1ES

A Gutter-Pipe Mast

IN THE spring of 1927 at 90X and 9WR, Louisville, Ky., it was necessary to erect a mast to raise the far end of our sky wire since there was nothing any higher than a rickety 12-foot garage.

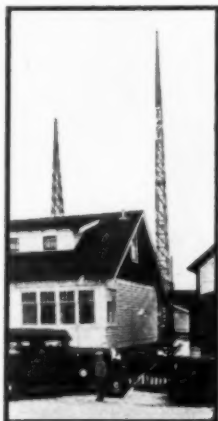


After much debate on wood versus metal versus cost, the mast described below was put up. The first attempt was not so encouraging as about 70 feet of 4-inch corrugated galvanized iron down-spouting buckled and fell as it was being put up, ruining much of its length. The badly damaged places were cut out with tinners shears and what was left reassembled to a total length of 53 feet. This unit was then raised easily with the aid of five local hams. A Y-shaped wooden support made from 2" by 2" was used to support the mast in the center while it was being raised. Probably the original 70 feet could have been lifted on the second attempt but we had cold feet and did not try it.

All joints were made by slitting a section of the spouting for about three feet, telescoping the next section into it and then wrapping with No. 14 galvanized iron wire at two places and soldering the wire and the cut. All guy wires were soldered on all the way around. Quite a lot of soldering is necessary and a good blow torch is essential.

A cap was soldered at the top to prevent rain from getting inside. A coat of paint would also have been useful but were in too much of a hurry for that.

All guys should be broken up every 15 feet or oftener by "egg" insulators, as the distance from the ground up the mast and down a guy wire is long enough to get into resonance with the antennas. No doubt there is some energy wasted in the mast itself but no bad effects were noticed.



DOES VE4GT DELIGHT IN OWNING THESE SKY-HOOKS? NO?

A three-foot hole is deep enough to put the base in and after lining up the mast, concrete should be poured around the base.

Two pulleys and ropes were used, since two separate antennas were used on the same mast. The ropes should be fastened some distance from the base as otherwise the slightest wind will cause quite a noise when the rope strikes the tin mast.

It is advisable to run the guys as far as possible from the base in order to get better stability. Four guys at the top and four more about three-fifths up from the base are needed.

The completed mast stood some heavy winds and was really quite strong, inexpensive and easily raised. The total cost, including guy wire and insulators, was around \$12.

— R. B. Parmenter, W1MK

Solid Construction Sectional Mast

AFTER losing two fifty-foot sycamore poles during heavy windstorms and also a metal down-spout support that "folded up" I decided that it was about time to build a mast that would stand the wind and survive for one or more years. A large backyard was available in which to erect the mast and antenna — however, there was one disadvantage. The OM had planted several rows of cherry trees on this lot. Therefore, it was necessary to be very careful in erecting the mast and to be reasonably sure that it would remain in the vertical position. To have the mast fall among the cherry trees would have been equivalent to receiving a letter from the RI stating the station license had been revoked.

Several visits were paid to ex-9AUS and 9DLR, noting the excellent masts being used. Their ideas were FB, but the masts required a large amount of pipe, which I couldn't obtain. Calling on several of the local lumber yards, I discovered that twenty-foot 2 x 4 could be purchased for a very low price. By using them, two fifty-foot masts were built for a small sum.

To duplicate the procedure, the following material would be necessary:

- 1 pc. 6 x 6, 10 feet long (oak or cedar).
- 3 pcs. 2 x 4, 20 feet long.
- 2 pcs. 2 x 2, 20 feet long.
- 1 pc. 2 x 2, 10 feet long.
- 23 3/4" bolts, 12" long with lock washers etc.
- 8 3/4" bolts, 8" long with lock washers etc.
- 1 strong pulley, large enough to take 1/2-inch rope.

Several hundred feet of No. 10 or 12 iron wire for guys.

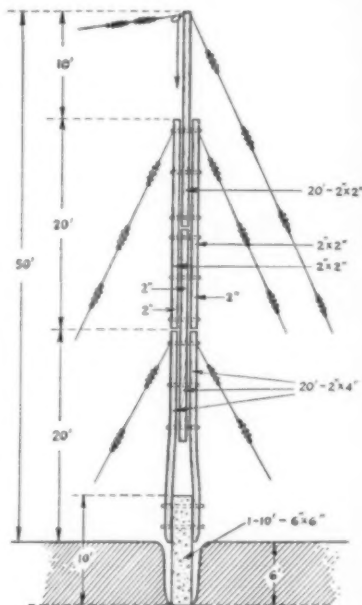
Several dozen small insulators for "breaking up" the guys.

Approximately 150 feet of manila rope.

The material is assembled as shown in the sketch, using 3/4-inch machine bolts. The 6" x 6" should be set in the ground about six feet, leaving

about 4 feet in the open, in order to bolt or fasten the bottom section of the 2 x 4 uprights. Although the 6" x 6" can be erected first, it is easier to assemble the entire mast and erect it as a unit. The hole for 6" x 6" should be dug and also sloped at one side, so that the base will slide into position as the mast is raised.

On these particular masts, seven guys were found to be sufficient. Their length will depend somewhat on the space available. Three of the guy wires should be attached at a point 20 feet



from the ground, three at 40 feet and one at the top of the mast as a back guy. The guy wires should be broken into short lengths, by the insertion of small porcelain insulators. One every eight to ten feet should be satisfactory.

Before the mast is raised, it should be given one or more coats of paint. This will not only improve its appearance but will prevent the wood from decaying when exposed to the elements. The manila rope should be tarred.

The 2 x 2 sections were found strong enough to support a six wire cage antenna and no difficulty should be experienced when using a single wire antenna. If desired, the top section can be built using 2 x 4. However, this makes the top rather heavy and difficult to handle. Although a block and tackle could be used to good advantage, it is not necessary, as three or four husky amateurs or BCL neighbors can easily raise the mast. It is very helpful to have one or two poles (or ladders) that can be set against — or under — the mast as it is being raised. The use of the poles not only

(Continued on page 88)

Results—International Goodwill Tests

Part II*

IN AUGUST QST we presented the "DX" stations heard in the United States and Canada during the International Goodwill Tests of February and March. This month we list the amateur stations of the United States and of all other countries of the world as they were reported heard on the various continents. We estimate that amateurs were on the air in approximately 100 different countries, in every clime. The number of stations logged is difficult to ascertain although it can be stated with assurance that the figure is in the thousands! Many chaps will find that their signals were logged in countries never before reached. That is just one of the intriguing features of such "tests" as these.

The method of listing stations heard on the various continents is very similar to the system used last month. The calls are tabulated to show on which continents, in which countries, and on which frequency bands each station was logged. The "international prefix" of each country is given rather than the complete name of the country.

The list of calls speaks for itself. It shows just where each station was logged, how many different reports were received, and on what frequency bands reception was made. We observe by a study of the list that those amateurs who made a careful choice of bands, and who transmitted consistently through the specified periods came out "on top." Those with "automatic senders" had some advantage over those who had to send with their "fists." But aside from this, no matter what the method of transmission was, the fact that reports were received indicates that the signals from the respective stations must have had some "punch" back of them. The operator of every station listed should feel a certain amount of "pride in his outfit — and those who transmitted but were not reported should feel "somehow or other," too!!

Many good contacts were made during the "QSO periods" of the tests, with new "international friendships" being made on all sides. Thousands of QSL cards were exchanged as a result of the "I. G. T." and newly made friendships were more closely bonded thereby.

A. R. R. L. Members will be interested in knowing that their Headquarters Station, W1MK, was active 24 hours per day during the "test" periods. This continuous operation was made possible by the coöperation of the following Hartford amateurs, who stood watches in regular "shifts":

Raymond Lowery, W1AFB, Francis Cowles, W1AOK, Frank Bendzinski, W1BHQ, John Zaleski, W1CFY, and Chief Operator Parmenter, "RP."

Outstanding stations reported for the February 20th–26th period and the approximate number of different sources from which each was reported are as follows, being listed by frequency bands and by continents: (3.5 mc.) *In Europe:* W1MK 10; W1MX 8. (7 mc.) *In Europe:* W4FT 114; W3CCF 79; W2AG 75; W1MK 64; W1MX 59; PY1FF 57; K5AB 55; W1CH FM8CR 50; W2DM 41; W1BDI 39; VOSMC 38; W3MD 37; VK3ZX 35; W4ABT W4EC 33; VE1BV W2AEN 32; CN8MJ 31; W1BNP 30. *In North America:* EAR224 7; EAR96 6; G5BY VK3ZX 4; J1CT J1DM K5AC VK2OC 3. *In Oceania:* W6EGH 24; W6SO 22; W6AM W6YB 21; W6VQ 19; W6CXW W6YO 17; J1CT W9BNT 16; W7YX 15; W6BC G5BY 14; EAR227 W3CCF W4FT W6AZH W9GDH 13; W7DL 12; W1BDI W1MK W2AG W2VH W4DW W6BJA W6DDE W9EVE OM1TB 11; W2ANX W6BIP W6VX W9BVI 10. (14 mc.) *In Africa:* W1AE5; W1BDI W4AWO W8CTE 4; W1MX W1LZ W1VC WSCFW PY2AY 3. *In Europe:* W1AE 59; W1LZ 40; W1MK 38; W3CCF 32; W1BDI 28; W8BLP 27; VE1DQ 25; W1WV W4AGR 24; W1BHM 23; W1ZJ 22; W1PH W2AGX W8CTE W8DOD 21; VOSMC 19; W2BSR 18; W1CJD W2ARB FM8CR 17; W1BSK W1ASL W1DCH 16; K4RJ VU2FX CN8MI 15. *In Oceania:* J1CT 5; CT1AA VS6AE 4; J5CE VU2DF 3. *In South America:* W1ZZ W6BJA W6SO 6; W6AHP W6BVX W9LF X1AA W6BAM 5.

Outstanding stations reported for the March 10th–16th period and the approximate number of different sources from which each was reported are as follows, being listed by frequency bands and by continents: (3.5 mc.) *In Europe:* W1YU W3NF 4. *In Oceania:* W2AWL W2CFV W3AIP W6AEP W6EGJ W9FRH 2. (7 mc.) *In Asia:* W6BC W6VQ 6; PK4AU VK3ES VK3ZX W6AM W6CXW W6EGH 4; KA3AA W6CX W6ADK W6BJA 3. *In Europe:* W3CCF 37; W4MK 24; CN8MJ 24; W1BDI 18; VK3ZX 17; FM8IH 15; FM8JO 14; W4ABT FM8CR 13; SU1EC VK3VP 12; W8CAU FM8GT VK2OC W4EG ZL3CC 11; ZL2CI ZL3AQ 10. *In Oceania:* W6VQ 19; W6SO 18; W6BC W6CXW W6EGH 17; W3CCF W6AM 15; J1CT W6AHZ W6ADK 14; W1MK W8CAU 13; CT1AA 12; W7VN W9BNT 11; FM8IH W6AHP W6YO W6YU 10. (14 mc.) *In Africa:* W1BDI 32; W3CCF 29; W1MK 26; W1LZ 22; W1BHM W1MX 18; CN8MJ W2BSR 17; FM8EG W2AIS 13;

*This is the second and last section. Part I appeared in August QST.

W1AIL 12; W1ZJ 11; W1WV W2HJ W3MD W4AGR W4MR 10.

In addition to the lists of "outstanding" stations above, we might mention here a few cases of "exceptional" reception. Probably the most unusual during the February period is the reception of W4FT in Siberia on 7 mc. He was the only "W" amateur reported heard in Siberia. W7BYD was logged in the Netherlands on 3.5 mc. On 7 mc. the following reception was made: W6ZZG in Austria; W6BUO in France; W6SN in Roumania; W6BST in Switzerland. On 14 mc. 6's and 7's were logged on Europe as follows, February period; W7WL in Czechoslovakia; W6CBP, W6CGQ, W6CLP, W6COQ, W6QW and W7TX in Great Britain; W7ADM and W7BLP in Hungary; W6BC in Italy; W6AMO, W6BAK, W6CV, W6DER, W6FCL and W6YG in Portugal. During the March period on 7 mc.: W6AM was logged in Hungary, and W6BC was logged in Spain. On 14 mc. W6AHP, W6CLZ, W6CXW and W7AUL were logged in Great Britain; and W6BRD was logged in Hungary.

The list follows. We hope your call is there!!

The number of reports from different sources in each country and on each band are indicated as follows:

No asterisk	1 report only
*	2 or 3 reports
**	4 or 5 reports
***	6, 7, 8, 9 or 10 reports
****	11, 12, 13, 14 or 15 reports
*****	16, 17, 18, 19 or 20 reports
etc.	

— E. L. B.

First Period — February 20th–26th

1750-ke. band

LOGGED IN EUROPE

IN GERMANY: G 6GW

3500-ke. band

LOGGED IN AFRICA

IN SOUTH AMERICA: W1 SC W3 AHA W4 FI W6 CGE W9 EQO

LOGGED IN EUROPE

IN FRANCE: W1 AAT AUC CHR CLZ CRV DPG EV MK MX W2 CFV CZX DEL DV W8 AHO ZL 3CM IN GERMANY: FM 80R OH INJ 2PM SM TVG SP 1BT VU 2FX W1 BDI BGW CJD CRV HR MK** MX** SC W2 AHG CBW CFV* DEE W3 APC ASJ ATF AUG AWU BA W4 VE W8 EBP EFO IN GREAT BRITAIN: W1 BNP CJD CRV LE MK* MX W2 CFV* CGD OF W3 AQR CXM ZX W4 LL IN NETHERLANDS: W1 CJD CRV JE MK MX W2 CCS CFV CPZ DIU VO W3 AQR ASJ ASW BRV OK W4 AFK W7 BYD W8 AHO AKV BAS BUG DSN UV WG W9 ELL IN POLAND: D4 MUX RDN UAO G 5UY OH 2NJ

LOGGED IN OCEANIA

IN NEW ZEALAND: W1 MK* W6 COQ EVD

LOGGED IN NORTH AMERICA

IN COSTA RICA: W1 CID ME MK MX W2 CFV W3 BAY ZX W8 AJG AKV FZM W9 BNT

7000-ke. band

LOGGED IN AFRICA

IN ALGERIA: W1 BUP W2 AIS BCB DM IN MOROCCO: F 8NP G 2BM VK2 OC VK3 LX VP W1 AF BDI BNP CH SI W2 AEN AG AKW AOS APD BHW BSR BST CBW DM SB W3 WT W3 AKU BPH BQV CCF CXL W4 ABT AGP

AGR AJX DW EG EI FT* NC OI SI ZH W5 ACD W8 ABS ACK BGD DW BIS BNG CF ZY W9 AFS VW IN SOUTH AFRICA: CT 1AK FB CN PZ G 2VP J 1CT* K 5AB AU 1PR LU 5AR PK3 PR PK4 AU* DA VU 2KH W1 AAO AB ANA BNP CH* LZ ME MK* MX* W2 AEW AG AIS ANI BCB BSR BST BXA CCI CX CTC CZP DM OT W3 AIZ APN* BBB* BCF BGR BLF BUX CCF* CHP CXL* MD W4 ABT ATS DW EC FT* HF RE WE* ZH W5 ACD AEU AGO AGV REZ CA W6 AEO AFH AM BC BOQ CFE CFB DDE DIO EDV EGH* EXO* MV* OW SO* TC VO VU W8 ABS* ACU ALT ANT BL BOT BTY CIF CII DV EL JN MK SH YX W9 BNP CHD CNO EAY EIP II JT MC UM IN TUNIS: EAR 169 E* RB F8 HO IM ORM RJ RL RM SD SX TX UV ZG FM4 AB MBA FM8 HT G5 BY ML HAF 3BZ 8C HB 91 LA 2U

LOGGED IN ASIA

IN CHINA: JI DH DM DV EC EK EQ FF J 6CG 7CB KA JU KAI AP CM CO HR JR ISCA JBA PR RT SL UP ZC KA 3AA 4HW OM 1TB PK LR 3BG VK2 BQ FX MX VK EE EX CX DL WZ ZX YK4 GK YK5 AY PK VK6 MU V86 AE AG AM AN VU2 AC BG W6 AF AHZ AM BNU BUO EI EXO FDE VO ZL 2CE IN JAPAN: W6 GS SN ZL 2FI IN SIBERIA: W 4FT

LOGGED IN EUROPE

IN AUSTRIA: AUI NZ AU7 CZ KAH* KAO* KZ CMU GR JM LG MG WU WW W3 CA CN8 MD MJ* MK Z GTI AA AH AS AY CW FS GU CV2 VM CWS ABS H VM D4 ABR ABX ADC DDX FVB FVE GGG LNW PWR RDW RUQ RVX EAR 18 37 55 152 169 185 223 227 228 BUD GF KT MB MW KABT NX OL PO EU 4KAL 9BX R ATZ CWL ETC FX GRL JFM KS RJ RM RS TD TXU KX WW WAC ZP FM4 AB* AX MBA* FM8 BIP CP* CSP* DA E* MD RE* MD VK5 AY PK VK6 MU XH YU G6 KI LI GI SZV HAF 3VF 3VL 9R HB9 AA JH HC 1FG* II FC ID IM J 1CT SCC K5 AB* AC WR KJ IJR LA IV 2O OH 2OB 5OF OK 2PS ON4 FM LM NDO NK WAL OZL D UZ OZ2 P OZ7 LB LK PA6 CL DA FLX GO GW IM JO PK3 BG BO PY IFR SM 3WJ TXE SPI BO BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE 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CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP 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IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP 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AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3 6D ZT1 A T ZT 5R 6C ZU 6A IN BELGIUM: AU 7KA CM BQ BT CC SP2 KZ SP3 AR BA DC DQ FI IT KC ON SP XX SP PL TI 2FG 3LA* VE 1BV VO 8MC* VP 2PA VU BG FX** KH VK3 BW EK GF JF* JW LO VP* WL* ZH V* VKH 7CH W1 ABN ACI AGZ AJ AIE ANA* ATZ AY BDI* BHM* BNP BQ* BGR BSR BUI CH CLZ IH MK* MX* SI VO W2 AEN AEW AG* AGO ARI AIS API AUP AX* AZL BAZ BCX B1* BJ BO BOX BSX BXA BZB CBP CBW CCV CKN CMV CXL DM* DOY DSG HJ* KO JO NZ CW WT W3 APO BBB BCF BUX CCF* CCU CDK CNY CXL* D4 JM DM MU W4 ABT AGP AGR AIE AIO AOE AOD ATA AVT AMZ AZX BAI BIU DM DW EC* EG* FT** GO KK MK NL TP VP VW WE* VF ZH* W5 BU W6 ZG W8 DV FCB YI 2DC 6WG YM 4ZA YL 2BI ZLI CO ZN ZL2 CI CJ FI* JK ZL3 AG AJ CC* IQ ZL4 AI* AP ZSI C D Z ZS2 A AM C D ZS3

TB** OM2 DM TG* PK 1JR* 3BQ** 4AU SU 1CH UO
 JWB VE2 BE CA* VE3 BM EL* IF WL VE5 EH VPI CE
 PF** VQ3 MSN VSI AB AD* W1 V56 AD** AG* AH*
 AQ* VS7 AP GT* VU2 BG EX JP* KH W1 AAO ABN AE*
 ARB BDI** BFR BO* CC CDD CH** CJD COR EP LZ**
 ME MK** MX* SI ZJ W2 AAX AEN* AES AEW* AG**
 AIF AIS* ANK ANX** AX* AVN BDA* BHW** BRB
 BSR* BST BXJ CBW CJM* CMO CTC* DKH DM* DOY**
 FE JT PT SE TT UK* VU** W3 ANH APN* AVI BBN*
 BCF BFH BHV* BLS BM BRZ* CCF** CCZ CDK CXL**
 LD LX MD** UT ZD W4 ABJ ABT* AGR* AIE AIX* AKH
 AOE ARO BT CH CS DW** EC* EG FT** GW IF KK
 ME NL OI RT SI SS TP TY WE ZH* W5 AAI ACB ACD*
 AGO AGY AH* AHW ANI AOT AOV* AVR AXL AZV**
 BEB BMI* BMV BPN BNB BUZ* CAI FW** UX ZP W6
 ACL ADK** AFH AG AHP** AHZ** AID ALU AM**
 AME ANN* ANO AOR** API APM AUX** AVX AWX
 ANX* AXV AZX BAX* BC** BCN BDP* BFH BHM BIF*
 BIP** BIV BJA** BKM* BLI BLS BOQ BPC BPI BOH
 BQI BOJ** BRW BSK* BTB BTM BUO* BYC BVK BYM
 BVO BVQ BVX* BWK BWX BXL* BY BZE** CAR CDA
 CEO CHL CIO* CNN CO COS CRI CUH* CUL CUT*
 CVF* CXW** DCJ DCP* DCV DDE** DEP* DER*
 DFR DIO DJI DL DLI DMO DNO DO DPI* DOA DSZ
 DVE DWA DWT DXM DZC* DZZ BAE EAH EBI* EBM
 ECW EDN EDW EES EGC EGH** EL* EOB EV* EVM*
 EYP EAX EXE EXQ* EYF EYM FCN* FDE FFP FEW*
 GH IJ* LO OS QW* SO** TC* TW UC VC VO** VX**
 WX YR** YQ** ZJ ZT W7 AAT* AFS* AHZ AIT AJN
 ALZ AVL BBI BTX DL DZ DN DG* IF PK OLS UIR
 VU** VT* WT VT W7 ABS AOU AUW AIO BAD BX BL
 BNV* BPK BPM CFA CFT** CTE CU* DE DED* DGP
 DIJ DNT DYE* DYK EGY EKH FAF FEY KY OE** OZ
 PL SI VX** ZN ZV W9 ADG* ADN AIX ARN ASO**
 AWC AYV* BAY BEP* BBJ BKQ* BNT* BO* BT
 BST BTU BVB BSK* BTD CDE* CES* CHD* CME*
 CNO CRO CSB DFH DH DNT DO DRO ECW EF EGD*
 EIT EN ERU EYE** FAW FMK* FUR* GA* GBJ GCG*
 GDD GDH** GDI* GDS GEX* GFK GFZ GM* GHV
 GKI GKM GV* HWE LI* IU** IV IM LF LO LS OE*
 OI* ON OT* SF VC X1 AA* X* YI ZDC* ZLI AR GO
 ZL2 BO CC CE* CI CU DN DW FI GJ* GO* HI HR JK
 ZL3 AQ AW BM BN CC DA* ZL4 AP AS DB IN DUTCH
 EAST INDIES: JI CT* EC KAI NA RT UP ZC W6 ADK
 AM* BUO CLP CXW* CYO DIO ECX EGH* EXO FCN
 QW RB* SO* VQ* YB* W7 DL IN NEW ZEALAND:
 AU IAX CTI AA AH D4 ABR ADC EAR 96 104* 121 169
 185 224 227* FB AP GG IFM KF TX UC WB XZ FM 8WZ
 GZ L2 G5 BV* ML LA HAF3 BS QX HAF9 AF* HB 9Q
 HG IFG 2EA HH 7C II HV IM JI CT* DN DV* EP* ES
 J3 CG CX DA DH DE DH JS CC K6 ARB AUQ COZ ETE K7
 ATD KAI CH CO IR LG OM* J2TB OSN 4DS PAO GH
 IM IO* PK ISCA 3BO SP IRC SU ICH VE 3BM JLZ 4BF
 VS IAD 6AG VU2 FX* KH W1 AE AR BDI LZ MK ZW
 W2 AEN AG AV BOX CHR CIT DM DOY* OA VH ZA W3
 ANH* APN BH CC* CXL* UT W4 ABT CS DW FT*
 IV JX MK* UX WE W5 AD* AEC* AEV AGO AH AKI
 AOY ATF AZV* BBR COS DE LV VV W6 ADK AGR ALZ
 ANN* AOR* AZV BAN BAX BC* BUO BVC* BWK BZE*
 CAE CGC CIO CKR CLP CM CTW CUH CUL CUO CXW*
 CYV DDE DEP DH DOW DPT DSE DUH DYP DZG EAQ
 EGH* EIC ELC ENY EOP EXA EXO PZ SO TC* TM TS
 VM VQ* VV W7 AAT* AFS AHS AIT ALZ AVL* AZZ DI
 EK IF LV PK OTI TS UR VHS VT W8 ANT BEN BGT*
 BKP BOS BO CAU CDF FEF RH SG* SI YX W9 ABB
 AM AUH BIF BII BIR BNT CME DLN DWD ELG EN
 EYE FMO GDI* GJF GML GV* J* TIKU OT VC X IAX
 IN THE PHILIPPINES: AC 8JS F 8WB GS BX BY JI
 DH DM DN DV EC EE EL EP ER ES J2 CG J3 CC CG DE
 DJ DI J SCC 6CJ 7CB K6 COW COZ OM ITB* 2DM PKI
 IR PK3 BO 1J PR PK4 AU DG SP ILC VK2 AX BA
 BR LX OC RA VJ XZ VV VK3 BW ES LO MX TX VV
 WL ZM ZN* VK4 AW BL VK5 W6 BG FW W6
 ADK AEO AFI AM* AHP AHZ* BC BCN BJA BKM BPC
 BOP* BSK BUO* BZE COS CUW COE CVW CVZ CXW
 DCV DIO* DLI* DPT* DSZ ECW EDW EGC EGH* EGM
 ET* EOV EV EXQ* FCN FDC FGS KU OS QW SO* TS
 VQ* WB VY* YQ* W7 DL LP OL X IAA XG 9DT ZL 1AR
 2GJ 3CC ZS 2F ZU 6W

LOGGED IN SOUTH AMERICA

IN BRAZIL: CN 8MI CT 1BX D4 AAR ABX ADC EAR 24
 96 185 224 FB AH BG BS DS OL WB G2 BN DV G5 BV
 YK G6 WY GJ SZY HAF 3OX JI CT EC EP J5 CC K5 AA
 CV K6 CRW OA 4Z PAO BP GH PK 4KU SM 7RV SP 3AR
 VK 2KL ZLJ 3BW 5AK W1 AE ARD BVB BDI MK VL VU
 W2 AD AEN AES AG APV AVN BST CBW CMO DM DO
 EFF MS VH WC W3 ANH CCF CKL CXL DD MD PN VV
 W4 ABT AGX DW EC EI FT II MK UC VE WE W5 ACD
 AUI AVL BW CU YD W6 AHP AM BOP BUO BZF COE
 CUH CXW DGH DOB DOB EDW EGH EXO VQ VY W7
 W7 AH AXO COL W8 AJK BAL CAU CBB CU DY EBC YX
 ZI ZN W9 BJN CME BGD ETP FHV GDH GKI GV LF
 MC ZL2 BE CI GD ZL4 AP IN PERU: CM2 MM WW EAR
 96 HH 7C K5 AA K6 IR KA 1JR VK2 AX BA BV HG HO
 OC XN ZW VK3 LO RJ VP XZ VV 4XN 5MF VU 2BG W1
 AE ANA MK W2 AG AIF AKK AV COE WC W3 APN
 BGE CCF CXL MD PN W4 ABV FT KJ MK OI SI TP WE
 W5 AEV AOY ATF AVR BKE BKZ BMI BSF GN MN PM
 W6 AEV AM BOP BSS CXW DDE DDI DLI DPT DTE
 EEP EGH EXO KC SO VO VQ VY W7 W8 BGT BNR
 BVP VY W9 BIF BNT BVH CHD CME FAU GKP FV MH
 VC ZL 2FI 3CC 3CL

14,000-ke. band

LOGGED IN AFRICA

IN ALGERIA: AC 9GH FM 4AB HC IFG HH 1B J 5CC K4
 RJ RT K5 AA PK IAC 3BM 4AJ 4JA PY 1FF ST 2D SU

IAA FT 3TP T1 2FG VEI BL BR VK2 LC LX OC VK5 HG
 V08 LC MC V04 CRE MSN VS IMK 3AC VU 2BG W1 AE
 ARB ARK AUC AWC BCH BDI CHR CMX DCH JO LZ
 PH SZ WZ Z2 W2 BLP BSR CXV DFO FF JN VO W3 CCF
 CDM CKT CPO FO W4 AWO* W5 LV W6 XN W7 AYH
 BLD W8 AFM ANT AVV BLP CCW CSW CTE* CZ RT
 SV W9 ADN IT X1 AA B ZLI AA BB ZS 4M 6Y ZT IT IN
 MOROCCO: CM 8AZ W1 AE AFU ASL AVU AYA AZY
 BDI* BGY BHM BNV BSK BWP BXC CDD CHR CIO
 COI HG HO LH LZ* MX* RY TW VC* ZJ W2 BRB W1
 ADZ BPM CC CCF CDK CDM CZN JN ON PC VV CX W1
 AE AEK AGR AWO OZ WE W5 ZA W6 FAN W7 DL W8
 AFP ALH APO AUW AYE AZ BBL BFG BKP BKY BLP
 BNV BOS CGW CFV* CJE CKH CFC CSW CTE DED
 DFW DHU DLA DML DOD DPO DV DNV EDO ME NI
 SG SR SU SV TP W9 AMJ DKU GV LF LH IN SOUTH
 AFRICA: CT 1AA G 2YD HAF 4D PY 2AJ W1 AE* BXC
 MK W2 AG W3 CTR CXL W4 AU W9 LF JI

LOGGED IN EUROPE

IN AUSTRIA: K4 RJ I CT VE 1BR ZCA W1 AE* W2 AD
 ADO BSR MB W4 EC W9 ADN ZS 6V ZU 5B 6W IN BEL
 GIUM: CN 8MI FM 4AB SCR K4 RJ VEI BV DO 8MO
 W1 AE ASL BHM CJD CLZ CVI LZ MK PH OJ RU WY
 W2 AGX BW W3 BLO CCF CM W4 AG AGR AWO W8 CCS
 CTE DOD IN CZECHOSLOVAKIA: AC 2AK CN 8MI
 ET 8FA FM 8CR K4 RJ PC IAC 3BO PY 2AJ RV 2A* VE
 1BR 2AP VK 6G F53 AC VS7 AP CNU2 DE FX W1 AE
 AK BDI BIH CDD DCH HG LZ* MK* RR* VV* ZI WY
 AGX AZO BI CIM CJI CUQ W3 BLO CCF DC FO W4 AGR
 AWO W7 WL W8 AZO BEN BLP CIR DOD SV TP WY
 GV ZD 2A ZS 6V ZT LZ ZU 6W IN FINLAND: W1 AE MK
 W2 ACF IN FRANCE: CM 8AZ CN 8MI CTI AAP AV CO
 D 4EV FM8 CR EG GK G 60B HAF IG 3C* K4 CCF K
 AA OH 8NF ON 4FE PK 3BO SM 7XA SP3 AR LZ* VE
 BT DM DO DR VO 8MC VS 7AP VU 2FX* W1 AE** AFB
 AK ASL* AVV AZV* BDI BGY BH* BHM BHN BNM
 BSK* CCF* CJD* DCH* DCU DFF IFJ JO LH LZ* MK
 MX* VDN WY* ZI* W2 AG AGR ARB* AUP* VV* ZI WY
 BSR BVP CF CIM CNH CPT JN NT WC W3 BPM CCF
 CEP DC FO* PF* W4 AGR* AIX AL DW RV W8 AGS
 AYO BIX BLP* CSW* CTE EYE GAF SU W9 JI ZS 6V
 ZU 6MW IN GERMANY: CM 8AZ CN 8MI EAR 24 JZ
 FM4 AB FM8 CR EG K4 OH 8NF RV 2A* W1 AE
 DM DO* XMM VEA XK VK 6GF VO 8MC* VS 6AP VU
 2FX* W1 AE** AK ASL BDI** BDD* BEO BHM
 BSK** BZ CA CCO CJD* CLZ DCH EZ HG* LH LZ**
 MK* MX* PH** RR* VC* WE WY* ZW ZV W2 AD*
 AGX** AIE AIS* AJJ AKK ANO ARB* BCK BRO* BSR
 CXV* DJO IM MB VO VP WC* W3 BKY BPM CCF
 CM** DC EO EG* JN KD* VF** W4 ADX* AGR** AIX
 AWO* FT OZ W5 AYO BDL BLP** CCW CJR CLM*
 CRA CSW* CTE** CXX* DOD* EME SU* SV** WY
 ABN ADN DF DKU EP* ENR ERU EV YH KX
 WY* ZU 6W IN GREAT BRITAIN: CM 8AZ* CN8 MI*
 MJ* CT 2AF F3 MTA FM4 AB FM8 CG CR** EG* GK*
 K4 RJ** K5 AA* OA 4Z 3BO PY 1FF 2AJ* SU IAO**
 V1 VB* VE1 BL BT* CO* DL* DQ* V2* V2* AP CA CO VK
 ZL2 2XU* 4XN VO 8MC* V56 AE VS7 AP* GT* VU2 DE
 FX* W1 AEJ ACK AE** AEI* AFE AFU* AGR* AGX
 AIF AK* ALB APU ARB* ASI** AVJ** AVV AVE
 AWD AYA* BAO BDI** BDL BED* BEO BFO* BHM**
 BIH* BIV* BRO BSH* BSK** BUX BXC** BWS BZB
 BCB* CDD* CDS* CG* CHR* CJD* COK* CPT COR
 DCH** DCM* DIZ DMO FIF* HG* JO* KHR* KJ N
 LH* LZ** MK** MM* OD FE PH** OB** OVS** RR**
 RW SZ* VC* WE* WY** YJ* ZJ* ZU W2 AAF ABX
 AD* AEP AFG AG* AGX* AIF** AIS** AID AJJ AKK*
 ALK* ANO* AOP* ARB* CZO BAK* BAL* BMM* BOK
 BOP* BOM* BRO* BRO BSR** BUM BWM* BVT* BZB
 CJI* CIM* CUQ* CVJ** CZP* DHP DKE* FD* FF HJ
 IM* KO KY* LF MB* RR VO** UF UV WC** W5 AID
 ARS* BHO BLO BPH* BPM** BOH* BOP* CCF** CDK*
 CM DC* EO* EQ FO* JN KN* US* ZJ ZN* W4 ABZ ADX
 AGR** AIX** AKH AW AWO** CS* DW** DZ ET* RR
 WE** W5 MR W6 CBP CGO* CLP* COQ OW WF TX* W1
 AFM AFI* AGS AIM ALH* AOO* AQB* BBN BEN*
 BJX BLP** BPO BSF BZB* CCW* CFW CFI* CLM CS*
 CSW* CTE** CXX* CZS DED* DJW* DOD** DVI DWN
 EDO* EY* EYE* EYS FCB ME* SI SU SY TP* W9 ADN
 AZZ BXJ DPU** ERU* FCB GV IJ* LF* LH VT VIZ DC
 Y16 KR* WG* ZL 2C1 ZS 4M* SU 6W* 6V ZU 6W* IN
 HUNGARY: CN 8MI** FM4 AB FM8 CR DA EG K4
 JR PY 1FF 2BN RV 2A* SU IAO VE 1DO VO 8MC** V56
 A VS7 GT VU2 DE FX* W1 AE** AK* BDI* BDS BHM
 BZ CJD CUB DCH GB GD HG JH LZ* MK** MX PH VC
 WY* ZP* W2 AGX AIB AIB* BKA BKA* AZO BRO BSK
 CIX CUQ IM VO WC* W3 BPM CCF* CDK CM FO W4
 AGR* AWO DDW W7 ADM BLP W8 BLP** CJE CJR CS
 CSW CXX DOD* SV W9 ADN Y16 KR* WG* ZB 6V ZS
 6V ZU 6W IN IRELAND: FM4 MBA K4 RJ
 VU2 IAO VE 1BT VO 8MC W1 AE YR BFO BHM BSK
 BZ CJD CJD BSB QZ SZ YU W2 AIF AIS AKK AZO
 BSR BOM BWP IM VO W3 CCF FO W4 AGL AIX AWO
 W9 ADN BFP IN ITALY: CN8 MD Z4 CTI AA* AE AV*
 EAR 96 169 EI 8B F3 MTA F8 DG DX WB G2 RV G5 BJ
 BY BZ CV SV YG G6 DHI JIP OZ OB RV VV W3 BHM
 VU NO HG IFG K4 RJ OZ LM UF PA 6CG VE 1B 2AP
 W1 AE ASL AVV AYA BDI BH BHM BNI BSK BSM
 CAB CDX CHR CJD DCH HG LH LZ MK MX SG SZ
 TW VC WY ZJ W2 ABP AD AIF AIS BAK BER BIR BVP
 BWP CJP CUQ CY CYP DEO DKU NT VO W3 AGR ANA
 CF CJK CJE CJE FO NR BP KR ARB* AZO AGR CKT
 LD MR W6 BC W8 AFM AJO BLP BOD CSW CT CTE
 DJV DWW W9 ENR EWT JI W1 AE* BDI* CJD* LZ* MK PH
 8CR VE 1DO VP 2MJ W1 AE* AK BDI* CJD* LZ* MK PH
 WY W2 AIF AIS* AKX ARB BWP DV W3 CCF CM 80
 WY AGR AIX AKH* BSR CTE CXX WY DDT JI IN
 POLAND: CN 8MI CTI AA AC AE AV BX EAR 91 98 128

(Continued on page 49)

56-Mc. Rolls Up Its Sleeves

Solid Traffic Work on Five Meters at the National Glider Meet

By E. D. Miller, W8CCJ*

JUST a year ago, we amateurs at Elmira, N. Y., were engrossed in a communication net at the second National Glider Meet. Operating telegraph transmitters on 3500 kc. and producing signals that were heard all over the country, we dreamed of compact five-meter sets which would permit duplex 'phone and avoid interference outside our own locality. Because this particular communication system requires fast and thoroughly reliable contact between the airport (center of activities) and the various hills used for glider take-offs, we believed that 56 mc. would be ideal. We know now that it is.

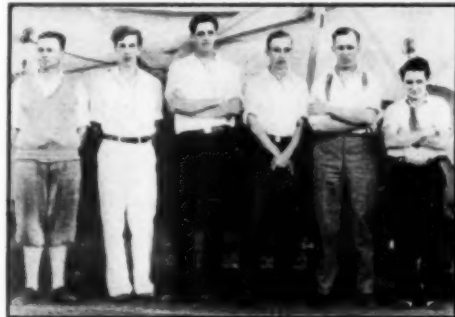
Because of the need for much constructional work and experiment, plenty of advance thought was given the problem by members of the Elmira Amateur Radio Association. Long before the meet, Mr. Edward Lewis, W8ACQ, built up a transmitter and receiver in the Hull manner and tests were undertaken. Successful operation being obtained at first "crack," Mr. Lewis was prevailed upon to build a duplicate outfit for the Association. Two-way tests were then run off between the airport and five of the six available hillside take-off points. The sixth location, however, had us stumped. Placed, as it is, on the side of a hill facing away from the airport and heavily "shaded" by a higher intervening hill, it could be reached only by fitting a relay station in the higher ridge.

*1136 Pennsylvania Ave., Elmira, N. Y.

BELOW: Mecker, Lewis and Tower on location.

At about this time, Mr. G. Sayre, W8CSW, joined the group experimenting and brought along his two transmitters and one receiver. This apparatus was installed at the airport, releasing the outfit there for possible relay work.

Opening on July 11th, and continuing for two weeks, the meet was a scene of feverish activity on the part of our fellows. Gerry Sayre, chief operator at the airport, Ed. Lewis, W8ACQ, chief



ABOVE: The Elmira Crew—Ed. Miller, Roy Dahlhaus, Walter Bloss, Ed. Lewis, Gerry Sayre, Ben Kilpatrick.



LEFT: The Lay-out at Miller's relay station. The interested audience is John Murray, W2AMID.

operator of the main field station and the writer, operator of the relay station, were on the job from 5 a.m. to dark almost every day. Messages of every possible type were handled.

From the airport (where the Massachusetts Institute of Technology operated a complete weather observatory and forecasting bureau) weather reports were sent at frequent intervals to the take-off points. Instructions to pilots and ground crews; the times and details of all soaring flights; the ordering of lunches; endless personal messages; arrangements for picnics and dinner parties—all were included in the work. Also, of course, frequent person-to-person 'phone conversations had to be fitted in.

(Continued on page 88)



And Still They Come

Some Facts About the Recently-Announced Tubes

SINCE it's the fashion in these times to blame anything unusual on the depression, we suppose that w.k. state must have had a hand in producing the astonishingly large number of new types of tubes that has appeared in the past few months. Either the tube manufacturers have plenty of time on their hands to make real technical progress or they're trying to make it impossible for anyone ever to master the tube type numbers. We amateurs owe it to ourselves to keep tabs on what's going on technically, even though not all the developments are at first glance applicable to our own pet sphere. Of the eleven-odd types mentioned here, possibly only three or four will fit any well-defined need in amateur transmitters or receivers, but the others are of general interest, even if only to indicate trends in the b.c. receiver field.

The types covered here are known as the 41, 42, 43, 44, 52, 55, 83, 85, 89, Wunderlich and Triple-Twin. The grouping is not in the order of their announcement.

THE 41, 42 AND 43

These three tubes are all of the same general type; that is, audio power-amplifier pentodes with indirectly-heated cathodes. So far as we know at the moment, they are being made only by Sylvania, from whom come the ratings given below. The 41 is a tube about like the 238 but capable of delivering a larger undistorted audio output. It is not interchangeable with the '38, however, because it is equipped with a 6-prong base.

The 42 is a husky pentode with characteristics corresponding to those of the 247. It is capable of delivering slightly greater audio power than the '47, and in addition has an indirectly-heated cathode, the heater being for 6.3-volt operation. It also has a 6-prong base. We might use this one as a crystal oscillator or an amplifier in small transmitters. Its advantage over the '47 would appear to be the elimination of filament center-taps and by-pass condensers.

	Type 41	Type 42	Type 43
Heater voltage	6.3	6.3	25.0 volts
Heater current	.65	.65	.3 amp.
Plate voltage	167.5	250	95 volts
Screen voltage	167.5	250	95 volts
Grid voltage	-12.5	-16.5	-15.0 volts
Amp. factor	215	220	90
Plate resistance	120,000	100,000	45,000 ohms
Mutual conductance	1800	2200	2000 micromhos
Plate current	16.5	34	20 ma.
Screen current	3.5	6.5	6.0 ma.
Load resistance	11,000	9000	4500 ohms
Power output	1.2	3.0	.9 watts

The 43 is a special tube for 110-volt d.c. receivers, the heater being rated at 25 volts and .3 amperes. It will give relatively large audio power output in low-voltage sets.

The chief characteristics of all three types are shown in tabular form in column one.

THE 44

The 44, also announced by Sylvania, is like a 239 in its filament characteristics and in that the tube is a pentode, but is otherwise more like a 235 or 551 except for higher plate resistance. With these comparisons it should not be hard to recognize the tube as another of the series of variable-mu or "super-control" screen-grid pentode radio-frequency amplifiers (the adjectives are beginning to get out of hand lately!). It has a 5-prong base and a cap, like the two tubes with which it has just been compared, and can be substituted for the 239 directly and for the 235 if a change is made in the filament voltage. Here are its characteristics:

Filament voltage	6.3	6.3	6.3 volts
Filament current	.3	.3	.3 amp.
Plate voltage	135	180	250 volts
Screen voltage	90	90	90 volts
Min. grid voltage	-3.0	-3.0	-3.0 volts
Amp. factor	257	426	630
Plate resistance	250,000	410,000	600,000 ohms
Mutual conductance	1030	1040	1050 micromhos
At -10 v. bias	275	275	275 "
At -50 v. bias	1	1	1 "
Plate current	6.25	6.4	6.5 ma.
Screen current	1.5	1.4	1.4 ma.
Inter-electrode capacitances			
Effective grid-plate	.007	.007	.007 μ fd.
Input	3.7	3.7	3.7 μ fd.
Output	9.6	9.6	9.6 μ fd.

THE 52

The 52, so far announced only by Eveready-Raytheon, fits in between the 49 and 46 in the combination Class B-Class A group. It is made for the automobile receiver and has the 6.3-volt filament, but *not* indirectly heated. Unlike the 46 and 49, however, when the tube is used Class A the inner grid requires no bias at all; therefore the stage driving the 52 must be capable of delivering power with good regulation if distortion is to be prevented. This method of operation is recommended for 110-volt d.c. receivers where economy of plate current is not a factor, and the resulting rather high plate current makes it possible to obtain fairly large power output with low plate voltage.

Two 52's in a Class B stage properly excited will deliver three watts of audio power with 180 volts on the plates. As a zero-grid-bias Class A amplifier an output of one watt can be obtained with

100 volts on the plate (allowing 10 volts drop through the output transformer from the 110-volt d.c. line). Two of the tubes can be used in push-pull Class A with approximately double the output of one tube and somewhat less distortion.

The characteristics of the 52 are as follows:

Filament voltage	6.3 volts
Filament current	.3 amp.
<i>Class B Operation</i>	
Plate voltage	180 volts (max.)
Grid voltage (both grids)	0
Plate current (no signal)	3.0 ma. (two tubes)
Load resistance per tube	3000 ohms
Peak plate current (per tube)	70 ma.
Power output (two tubes)	3.0 watts
<i>Class A Operation</i>	
Plate and outer grid voltage	100 volts (120 max.)
Grid voltage (inner grid)	0
Plate current	42 ma.
Load resistance	2000 ohms
Power output	1.0 watt

The 52 has the regular 5-prong base.

THE 55 AND 85

Here are two which the broadcast people probably will use a great deal, but for which we

can see very little ham application just now. They are known as "duplex-diode triodes" — a swell name but not very informative. However, to get an idea of what it's all about just imagine a '27 with a pair of tiny semi-circular

plates enclosing the bottom of an extra-long cathode thimble and that's it, or at least that's the 55. The 85 is the same thing built into a '37.

The two extra plates form what we would ordinarily call a full-wave rectifier, but since these are receiving tubes it becomes a double diode or two-element rectifier. The diode detector in power detection circuits is supposed to give better quality of reproduction than grid or plate three-element rectifiers; besides, the rectified diode current can be used to control the grid voltage on r.f. amplifiers in automatic volume-control systems. The rest of the tube — that is, the regular grid and plate — can be used as in ordinary audio amplifier. Thus, these tubes kill a couple of birds with one stone — detector, automatic volume control and audio amplifier all in one bulb.

As intimated above, one of the tubes belongs to the regular a.c. series and the other to the automobile group. Here are the characteristics:

	Type 55	Type 85
Heater voltage	2.5	6.3 volts
Heater current	1.0	.3 amp.
Plate voltage	250	200 volts
Grid voltage	-20	-20 volts

Amp. factor	8.3	8.3
Plate resistance	7500	8300 ohms
Mutual conductance	1100	1000 micromhos
Plate current	8	7 ma.

Both tubes have indirectly-heated cathodes, 6-prong bases and grid caps. The characteristics given above apply to the triode output portion of the tubes. The diode plates should draw at least 0.5 ma. each with 10 volts d.c. between plate and cathode.

The information on these tubes came from RCA Radiotron-Cunningham and Eveready-Raytheon. Other manufacturers, no doubt, will also be making them.

THE 83

Now this one *does* look interesting. It's a grown-up 82, and any ham can use a rectifier

Filament voltage	5.0 volts
Filament current	3.0 amp.
Max. a.c. voltage per plate	500 volts r.m.s.
Max. peak inverse voltage	1400 volts
Max. peak plate current	800 ma.
Max. d.c. output current	250 ma.
Tube voltage drop	15 volts

tube that promises to stand the gaff. The only thing we regret is that the voltage rating is no higher than that of the 82, but the fact that the current rating is doubled is something. Yes, it's a mercury-vapor tube. We expect that

lots of them will be used in the plate supplies for low-power transmitters and for the low-power stages of big transmitters.

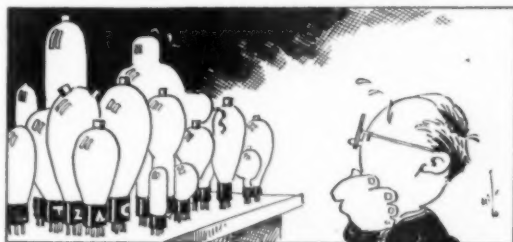
The 83 has a 4-prong base and is equipped with a large version of the new dome-top bulb introduced in the 57 and 58 types. For longest life it should be used with choke input to the filter, as is usual with mercury-vapor tubes. We'll find out later just how much more than 500 volts this tube will stand.

THE 89

The 89 is one of those multi-purpose (and multi-grid) audio tubes in the automobile series. By properly connecting the three grids in various circuits the tube can be used as a triode Class A amplifier, a pentode Class A amplifier and a Class B amplifier. The tube has a 6-prong base and one of the new small dome-top bulbs, with the inner grid brought out to a cap on top of the dome. The cathode is indirectly heated.

The tentative ratings and characteristics are as follows:

Heater voltage	6.3 volts
Heater current	.4 amp.



Class A Triode Amplifier

Plate voltage	160 volts
Grid voltage (inner grid; second and third grids tied to plate)	-20 volts
Load resistance	7000 ohms
Amp. factor	4.7
Plate resistance	3000 ohms
Mutual conductance	1570 micromhos
Plate current	17 ma.
Power output	300 milliwatts

Class A Pentode Amplifier

Plate voltage	180 volts
Screen voltage (middle grid)	180 volts
Grid voltage (inner grid)	-18
Load resistance	8000 ohms
Amp. factor	135
Plate resistance	82,500 ohms
Mutual conductance	1635 micromhos
Plate current	20 ma.
Screen current	3 ma.
Power output	1.5 watts

Class B Amplifier

Plate voltage (plate and outer grid tied together)	180 volts
Grid voltage (inner and middle grid tied together)	0 volts
Plate current per tube (no signal)	3 ma.
Peak plate current per Tube	75 ma.
Max. continuous power output (two tubes)	6 watts
Av. power output at 5% total harmonic distortion with load res. of 3400 ohms per tube	2.5 watts

The information on this type comes from the RCA Radiotron-Cunningham organization.

THE WUNDERLICH TUBE

The Wunderlich tube, which is being made only by Arcturus, is a special design for detection and automatic volume control. It has two grids co-cylindrical about the cathode — really a push-pull grid circuit — and in suitable circuits this symmetry between the two grids and cathode causes the radio-frequency input to balance out so that no r.f. appears in the plate circuit. Using power grid detection the rectified grid current can be made to control the bias on preceding r.f. amplifier tubes and thus automatically control volume. In its normal characteristics — measured with the two grids in parallel — the Wunderlich tube is a good deal like the 56. The characteristics are as follows:

Filament voltage	2.5 volts a.c.
Filament current	1.0 amp.
Plate resistance	12,000 ohms
Mutual conductance	1200 micromhos
Amp. factor	12
Plate current	2 to 5 ma.

The tube is also made with a 6.3-volt filament for the automobile series. Other characteristics are exactly the same. Physically, there are two types, one with a 5-prong base and cap, the other with the new 6-prong base. Small bases and bulbs are used for all types.

THE TRIPLE-TWIN

This tube is a combination affair which looks like a '27 and '45 built into one bulb. It really

consists of two tubes with direct coupling. The input portion — that resembling a '27 — has an indirectly-heated cathode which is connected inside the tube to the grid of the output portion. The filament of the output part and the heater of the input part are connected in parallel, also inside the tube. The plates of both parts are brought out to separate terminals, as is also the grid of the input portion.

The tube does not constitute a direct-coupled amplifier in the usual sense because the grid of the output portion draws current on the positive swings. Distortion is minimized, however, because of a peculiar "compensating" effect attributable to the design of the tube and the phase relationships of the currents flowing when the tube is excited, by means of which the plate resistance of the input portion is made to vary so that the grid voltage on the output portion has the same form it would have if no grid current were drawn.

Three types of Triple-Twin tubes are being made by the Cable Radio Tube Corporation, one for a.c. operation, one for 110-volt d.c. sets and a third for automobile receivers. These are known as the 295, 291 and 293 respectively. All have 5-prong bases with grid caps on the top of the envelope. The tube can be used to replace the detector and audio amplifiers in broadcast receivers, the 295 having a power output of about 4.5 watts with 250 volts on the plate. Maximum power output can be obtained with very low signal voltages on the input section, since the power sensitivity is about ten times that of a '45 and three times that of a '47.

The Triple-Twin should make a good combination speech-amplifier and modulator for the low-power 'phone set. A single Triple-Twin has about enough output at 250 volts to modulate an r.f. input of 10 watts — as good as a 250 at 450 volts. The signal voltage required for full output is only 5 volts, as compared with 100 for the 250. This means that the ordinary double-button microphone and transformer can work directly into the Triple-Twin with no additional speech amplification.

— G.G.

Strays

We learn that John M. Clayton, ex-5ZL and one-time member of *QST* staff, has once more come East and is now with the General Radio Company at Cambridge, in charge of their amateur department. They all come back in some form or other.

SKIM MILK AND CREAM

And just to show how highly what we do print is regarded in some quarters, from one of the perennial crop of freshly sprouting contemporaries comes a solicitation for such contributions as *QST* does not consider acceptable for its pages!

A.R.R.L. Affiliated Club Directory

BEGINNING amateurs and active amateurs who have not heretofore availed themselves of the benefits of local club organizations but who now wish to do so will be interested in the directory of active affiliated radio clubs presented in this issue. This list of clubs is presented alphabetically by states. Club secretaries will appreciate inquiries regarding membership in their several associations. Visitors are welcomed at regular club meetings, and the meeting place and dates of regular meetings has been included wherever possible to make it easy for QST readers and amateurs who travel to visit and benefit from club discussions, technical talks, code classes, and other activities sponsored by every live-wire club.

Our A.R.R.L. records include the addresses of over 150 active affiliated clubs, and in addition information on some 350 affiliated radio organizations which must be classed as disbanded or now inactive. Since our directory was compiled in mid-summer, at a time when some clubs had temporarily discontinued meeting for that season, this listing must be limited to about half our very active clubs, since the required information was returned from only that number. Copies of the listing presented herewith will be available on

request. Club secretaries returning information too late to appear in our list may expect a listing of their club in our next published list which will appear in March 1933 QST. If your club is affiliated with the A.R.R.L. and is not included in our directory please see that your club secretary sends us the necessary information at once, not only for listing, but so that your club can be reinstated on the mailing list for A.R.R.L. bulletins which are sent only to active clubs, i.e., only to clubs from which we have current and up-to-date information.

Suggestions for "an amateur radio course of study" suitable for club work, a "sample constitution" containing many useful suggestions and helps for newly formed groups, and "how to organize and maintain interest in the radio club" are all available to any amateur group on request. Also already-organized clubs that may be interested in establishing an affiliation with the American Radio Relay League are invited to write for the suggested "resolution" to be considered by their organizations as a first step in bringing the subject before the A.R.R.L.'s Executive Committee for action.

— F. E. H.

Active A.R.R.L. Affiliated Radio Clubs

		CALIFORNIA			
Club	Secretary	Meeting Place	Dates		
Amateur Radio Research Club	Ralph R. Short, 4933 Malta St., Los Angeles	Gibson's Cafe, 1800 So. Main St., Los Angeles	2nd and 4th Wednesdays		
Oakland Radio Club, W6OT	Hugh D. Avery, 646 Mandana Blvd., Oakland	1551 Alice St., Oakland	Every Thursday 8 p.m.		
Santa Clara County Amateur Radio Ass'n	Mae E. Amarantes, 680 No. San Pedro St., San Jose	Chamber of Commerce Bldg., Cor. Market & West Santa Clara Sts., San Jose	Every Monday 8 p.m.		
		COLORADO			
Greeley Radio Amateurs	Morris Young, Greeley, Colo.	Chamber of Commerce Rms., Cor. 7th St. and 8th Ave., Greeley, Colo.	Every 2nd and 4th Thursday		
		CONNECTICUT			
Amateur Radio Research Club	William Beckwith, 40 Cape Ann Court, New London	Club Room, 573 Broad St., New London	Every Monday 8 p.m.		
The Providence Radio Association	Thos. L. O'Connell, 28 Haskins St., Providence	5 Ansell Ave., Providence, R. I.	Every Friday, 8.30 p.m.		
Twin City Radio Club	John J. Morris, 74 Gorham Ave., Hamden	E. I. Phillip's Shop, Rear, 12 Ward Place, West Haven	Every Tuesday evening		
Yale Radio Club, W1YU	Robert F. Wilson, 111 Grove St., New Haven	Dunham Laboratory of Electrical Engineering, Room 330, Yale University, 10 Hillhouse Ave., New Haven	No regular date		
		ILLINOIS			
Egyptian Radio Club	Harold Jansen, 3708 Nameoki Ave., Nameoki	Club Shack, Cor. Warren & St. Clair Ave., Highway Routes 3 and 4	1st and 3d Thursdays 8 p.m.		
The Fox River Radio League	Dwight S. Young, Oswego, Illinois	Variable	2nd and 4th Fridays		
Tri-Town Radio Amateur Club	D. L. Warner, 15423 Honore Ave., Harvey, Illinois	Harvey Radio & Electric Shop, 15333 Lexington Ave., Harvey	1st and 3d Fridays		
		INDIANA			
The Fort Wayne Radio Club	Richard T. Schultz, 920 Erie St., Ft. Wayne	Chamber of Commerce Bldg., 826 Ewing St., Ft. Wayne	Every Friday		
Indianapolis Radio Club	Robert K. Caskey, 2355 Stuart St., Indianapolis	46 Century Bldg., N. W. Cor. of Penn & Maryland Sts., Indianapolis	Every Friday 8 p.m.		
		IOWA			
Tri-Amateur Radio Club	Walter H. Dekay, 416 W. 1st St., Sioux City, Iowa	Club Rooms, Chamber of Commerce, 6th and Nebr. Sts., Sioux City, Iowa	Alternate Wednesdays, namely, 1st and 3d		
University Amateur Radio Club	Paul E. Griffith, Quadrangle, Iowa City	West Side Radio Station, W9IO-W9YA, Grand Ave., Iowa City	Every other Friday after October 7, 1932		
		KANSAS			
KAW Valley Radio Club	W. A. Beasley, 1451 Byron Ave., Topeka, Kansas	Chamber of Commerce Bldg., 7th and Jackson Sts., Topeka	Alternate Wednesdays		
Wichita Falls Amateur Radio Club	Mrs. J. R. Martin, 816 10th St., Wichita Falls	Nafsiger Bldg., Cor. Magnolia and Marsh Sts.	First and third Tuesday		
		MAINE			
Portland Amateur Wireless Ass'n	Charles W. Larrabee, 176 Prospect St., Portland	At homes of members	Every other Wednesday		
		MASSACHUSETTS			
M.I.T. Radio Society	Charles Finnegan, M.I.T. Dorms, Cambridge	Undecided	Undecided		
Springfield Radio Ass'n	Leslie E. King, 38 Douglas St., Springfield	Rear 76 Cortland St., Springfield	Every Saturday		
Worcester Radio Ass'n	Rudolph R. Lind, 25 School St., Worcester	274 Main St., 3d floor, Worcester	Every Monday 7:30 p.m.		

			MICHIGAN		Meeting Place		Dates	
Jackson Ass'n	Club Amateur	Radio	Secretary C. W. Wirtanen, R.F.D. No. 1, Jackson, Mich.		Jackson Public Library, Michigan Ave., near Blackstone St., Jackson		Every 2nd Friday, starting Sept. 9	
			MINNESOTA					
Arrowhead Radio Amateurs			Earl G. Staley, 5707 Cody St., Duluth	Palmer Anderson, Box 270, Route 1, Duluth		1st Friday through Sept. 2 from then on 1st and 3rd Fridays		
			MISSOURI					
O. B. P.			Dr. C. L. Klenk, St. Louis	Home of members in alphabetical order		Every other Tuesday		
The South Missouri Ass'n of Radio Amateurs			C. R. Cannady, 300 Sixth, Monett	Indefinite		Indefinite		
			MONTANA					
Associated Radio Amateurs of Helena			Fred Jeswine, 1125 Livingston Ave., Helena	—		—		
			NEBRASKA					
Cornhusker Amateur Radio Ass'n			B. A. Elliott (Pres.), 3112 Hol-drege St., Lincoln	Y.M.C.A. 2nd floor, 13th and P Sts., Lincoln		1st Wednesday 8:00 p.m.		
			NEW JERSEY					
Central Jersey Radio Club			N. Dmytrow, 308 W. 5th Ave., Roselle, N. J.	Recreation Hall, Taylor Park, Main St. and Ridgewood Rd., Millburn, N. J.		2nd and 4th Fridays		
Cumberland County Amateur Radio Club			K. A. Durst, Bridgeton, N. J.	—		—		
Delaware Valley Radio Ass'n			Ed. G. Raser, 315 Beechwood Ave., Trenton	Old Schoolhouse, Moon Tract, Yardley Rd., Morrisville, Penn.		1st and third Wednesday		
The Eastern Amateur Radio League			Albert S. Rydberg, 338 Hamilton St., Harrison, N. J.	C. Robert Seybolt, 163 Stover Ave., No. Arlington, N. J.		Every other Friday		
Hudson City Radio Club Inc., W2CBK			J. V. O'Hara, 37-39 Sherman Ave., Jersey City	37-39 Sherman Ave., Cor. Franklin St., Jersey City		1st Tuesday		
Newark Amateur Radio Ass'n			Harold R. Richman, 401 Roseville Ave., Newark, N. J.	Newark Branch of Y.M.C.A., 3d floor, Halsey St., Newark		Every Tuesday		
			NEW YORK					
Manhattan Radio Club			Paul Tiffany, 477 W. 140th St., New York City	The N. Y. Public Library, Hamilton Grange Branch, 503 W. 145th St., New York City		Every Friday 8 p.m.		
Nassau Radio Club			Geo. K. Graham, 192 Merrick Rd., Rockville Center, Long Island	Cor. of Atlantic Ave., and Court St., Oceanside, L. I.		Every Friday 8:30 p.m.		
Radio Ass'n of Western New York			R. J. Cunningham, 341 Colvin Blvd., Buffalo, N. Y.	Gratwick Laboratory, 133 High St., Buffalo		2nd and 4th Saturday		
Radio Club of Brooklyn			Daniel Abrahamson, 480 Linden Blvd., Brooklyn	Clubrooms, 10th Ave., Brooklyn		2nd and 4th Friday		
Southern-Tier Transmitting Amateurs			Francis E. Larham, 112 Seneca St., Penn Yan	—		Every 4th Saturday		
Syracuse Amateur Transmitting Ass'n			Chas. E. Noxon, 835 Maryland Ave., Syracuse, N. Y.	Y.M.C.A., Cor. Montgomery and Jefferson Sts., Syracuse		1st and 3d Tuesdays		
			NORTH CAROLINA					
The Winston-Salem Amateur Radio Club			G. D. Taylor, P. O. Box 1334, Winston-Salem, N. C. or Y.M.C.A. at Winston-Salem, N. C.	Clubhouse, Bellview St., Ardmore, Winston-Salem, N. C.		Bi-weekly on Friday nights		
			NORTH DAKOTA					
James River Radio Club			Clayton Koth, 502 Milwaukee St., E., Jamestown, N. Dak.	Clubroom, Booth 12 in Grandstand at County Fairgrounds on South Fourth Avenue		Every Wednesday 7:30 p.m.		
			OHIO					
Cambridge Amateur Radio Operators			George Smith, 729 So. 8th St., Cambridge, Ohio	Chamber of Commerce Rooms, Wheeling Ave., Cambridge		1st and 2nd Wednesdays		
Columbus Amateur Radio Ass'n			D. A. Young, 914 Ellsworth Ave., Columbus	55 E. Gay St., 4th floor, O. N. G. Armory, Columbus		Alternate Fridays 8 p.m.		
The Lakewood Radio Club			Wm. R. Parsons, 1589 Clarence Ave., Lakewood, Ohio	Indefinite		Every Friday		
Norwalk Amateur Radio Ass'n			Homer Lawrence, 16 So. Garden St., Norwalk, Ohio	Central School Bldg., 3d floor, East Main St., Norwalk, Ohio		Every Monday 7:15 p.m.		
			OKLAHOMA					
The Frederick Amateur Radio Club			Owen Fry, 319 N. 11th St., Frederick	102½ West Grand Ave., Frederick		1st and 3d Tuesdays		
			OREGON					
Coos Bay Amateur Radio Club			George Worthley, 635 So. 9th St., Marshfield	Marshfield City Hall, Marshfield on 2nd Thurs. and North Bend City Hall, North Bend on 4th Thurs.		2nd and 4th Thursdays		
			PENNSYLVANIA					
Chester Radio Club			Frank D. Gorman, 330 Taylor Terrace, Chester	Club Headquarters, 1013 Butler St., Chester		Every Thursday 8:00 p.m.		
Western Radio Club of the West Philadelphia High School, W3AFB			Frank K. McNaull, Jr., 2517 So. Pershing St., W. Philadelphia, Pa.	Rooms 224, 226, second floor west in West Philadelphia High School		Every Monday 2:30 p.m.		
Western Radio Communication Society			John W. Callaghan, 719 S. 52nd St., Philadelphia, Pa.	Dietrich's Hall, 3d floor, N.W. Cor. 60th and Girard Ave., Philadelphia		2nd and 4th Mondays		
Williamsport Radio Club			F. Alan Glaes, 21 Washington Blvd., Williamsport, Pa.	Williamsport Y.M.C.A.		Every Monday 8:30 p.m.		
			RHODE ISLAND					
The Associated Radio Amateurs of Southern New England, Ind.			Edwin Bittcliffe, Jr., 171 Mendon Ave., Pawtucket, R. I.	54 Kelley Ave., E. Providence, R. I.		Every Friday 8:30 p.m.		
			TEXAS					
San Antonio Radio Club			C. A. Murgatroyd, 133 Thelka St., San Antonio	St. Anthony Hotel, San Antonio, Texas		Every Friday 8 p.m.		
			VIRGINIA					
Richmond Short Wave Club			Chas. C. Justice, 3201 Ave., Richmond, Va.	Central Y.M.C.A. 7th and Grace Sts., Room 201, Richmond		Every Tuesday 8 p.m.		
			WASHINGTON					
Radio Club of Tacoma Inc.			Laurence Q. Kelly, 4919 So. Prospect St., Tacoma, Wash.	Club House, 1462 So. Oakes St., Tacoma, Wash.		Every Tuesday 8:00 p.m.		
The Amateur Radio Club of Seattle			Arnold Morrison, Bothell, Wash.	Y.M.C.A. Bldg., Room 610, 4th Ave. and Madison St., Seattle		Every Tuesday 8:00 p.m.		
			WEST VIRGINIA					
Ohio Valley Amateur Radio Club			Ross J. Arrick, 136 No. 11th St., Wheeling, W. Va.	Intermediate Court Room, City-County Bldg., Wheeling, W. Va.		1st and last Fridays		
			WISCONSIN					
Northern Wisconsin Radio Club			Bob Johnson, 712 So. Dewey St., Eau Claire, Wis.	—		—		
The Milwaukee Radio Amateurs' Club, Inc.			Henry G. Barnes, 2841 No. Murray Ave., Milwaukee	Public Museum, No. 8th St. and W. Wisconsin Ave., Trustees Room, Milwaukee		Every Thursday Sept. 10 June		

CANADA		Meeting Place	Dates
Club	Secretary		
Victoria Short Wave Club	David Scholes, 1748 Davie St., Victoria, B. C.	1415 Lang St., Victoria, B. C.	1st and 3d Saturdays 8:00 p.m.
British Columbia Amateur Radio Ass'n Inc.	Willard Young, 2961 E. 5th Ave., Vancouver, B. C.	Clubhouse, 2961 E. 5th Ave., Vancouver, B. C.	Every Tuesday
Wireless Ass'n of Ontario	S. B. Trainer, 4 Shorncliffe Ave., Toronto 5, Ontario	Various homes of members	1st Friday
South Shore Radio Club	N. S. Lariviere, Maple Ave., St. Lambert, Que.	645 Desaulniers Blvd., St. Lambert Que.	1st and 3d Wednesdays
Regina District Radio Ass'n	Arthur Driver, 1900, Robinson St., Regina, Sask.	Room, 107, Regina College, College Ave., Regina, Sask.	4th Tuesday

Science Service Ursigrams*

Interpreting the Broadcasts of Cosmic Data from NAA

By E. B. Judson

PERHAPS amateurs can explain some of the vagaries of their high-frequency transmission and reception if they will copy the cosmic data broadcasts sent from the U. S. Naval Station at Arlington (NAA) at 22:00 G.M.T. (5 p.m., Eastern Standard Time) on frequencies of 12,045 and 4015 kilocycles. The information contained in the messages is compiled by *Science Service* in coöperation with the American Section of the International Scientific Radio Union and contains daily data on terrestrial magnetism (magnetic storms), auroral displays, sun spots, Kennelly-Heaviside Layer heights, and solar radiations.

The data for terrestrial magnetism, supplied by the U. S. Coast and Geodetic Survey from its observatory at Tucson, Arizona, should be especially useful in correlating the variations of the earth's magnetic field with high frequency transmission and reception. Commercial radio companies have found marked decreases in the strength of east-west signal intensities due to the disturbances in the earth's magnetic field, more commonly called "magnetic storms."

Magnetic conditions are divided into three classes: A quiet day or day of no disturbance is given a character "0"; a moderately disturbed day a character "1"; and a severely disturbed day a character "2." This part, as given in the broadcast, will no doubt be most valuable to the amateur observer.

The data, as broadcast from NAA, are in coded form which may easily be deciphered by use of the "key" given below. An example is also given which should be helpful.

Transmission of the broadcast is preceded by the letters "URSI," these being the initials of the Union Radio Scientifique Internationale. Each class of data is coded separately and preceded by an identifying word: "MAG" for terrestrial magnetism (magnetic storms); "AUR" for auroras; "SOL" for sun spots; "RAD" for solar constant; and "KHL" for Kennelly-

Heaviside Layer Heights. The data are expressed in a number code in groups of five. The broadcast is terminated by "SCIENSERV" (Science Service).

In the portion of the broadcast relating to magnetic storms, the first figure in the first group indicates the day of the week: that is, "1," Sunday; "2," Monday; "3," Tuesday; etc. The second figure of the first group indicates the character of the day: "3," quiet or 0 character; "5," day of moderate disturbance (moderate storm) or No. 1 character; "7," day of severe disturbance (severe storm) or No. 2 character. The third figure in the first group indicates: "3," disturbance of short duration; "5," rapid variations; "7," long period variations; "9," irregular variations; "X," not used. The fourth figure of the first group indicates that the second group gives the time of: "3," beginning of storm (G.M.T.); "5," end of storm; "7," beginning of storm, the end being given in the third group; "X," not used. The fifth figure is unused and sent as "X."

The second group gives Greenwich Mean Time (G.M.T.) of beginning or ending of magnetic storm as indicated by the fourth figure of the first group. (If a magnetic storm begins and ends on the same day, a third group will give the time of ending.) First and second figures: Hours preceded by "zero" if less than ten. Third and fourth figures: Minutes preceded by "zero" if less than ten. Fifth figure: Tenths of a minute in case of sudden commencement of a storm. Other times will be given to whole minutes only and "Z" will be the fifth figure.

EXAMPLE

MAG 1535X, 08407. Decoded, this means Sunday, moderately disturbed day, character 1; a disturbance of short duration. Storm ends 08:40.7 G.M.T.

If it is desired, further information in regard to the keys to the other portions of the coded broadcast may be obtained by writing to Science Service, Inc., Washington, D. C.

* Publication approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

Tube Types Tabulated

An Invaluable Memory-Jogging List of To-day's Tubes

TUBES to the left of them — tubes to the right of them" — we hope there'll be a lull in the volleying and thundering pretty soon. Anyhow it's time to stop for breath and see just what is available in the way of tubes. Hence the table herewith which includes all the regularly-made "standard" types and such special ones as have come to our attention recently.

The tubes have been listed in numerical order to make it easy to find out what kind of tube is meant when an unfamiliar number is encountered. Following the number is a brief description of the tube, its filament rating, the kind of base it has, and the issue of *QST* in which a more complete description can be found. This is the essential information necessary, we believe, to give some sort of mental picture of the tube and to fit it into the general scheme of things.

A word of explanation is necessary about modern receiving-tube groupings. Primarily, the tubes are grouped by the three types of receivers for which they are intended — a.c., dry battery, automobile or 110-v. d.c. — and can be identified by the filament ratings. The a.c. series have filaments marked "2.5 a.c.," some with indirectly-heated cathodes and some with ordinary filaments; the dry battery or air-cell group all have 2.0-volt d.c. filaments (no indirectly-heated cathodes in this group); and the automobile or 110-v. d.c. tubes are equipped with 6.3-volt filaments, indirectly-heated except for a few special types.

In each of the three groups above will be found a screen-grid r.f. amplifier, a screen-grid pentode

r.f. amplifier, screen-grid r.f. amplifier with the variable-mu feature, a screen-grid pentode variable-mu r.f. amplifier, a general-purpose triode (the good old 201-A in various degrees of refinement), a power audio amplifier, a power pentode, and a power amplifier for Class B audio — the latter usually fixed up so it can be used as a regular power audio amplifier instead of Class B and sometimes as a pentode as well. The last three are for feeding the loud-speaker. There will be some exceptions to the above, of course, because this thing has been the result of growth and did not spring into being full-fledged. And in addition there are various types of rectifier tubes for the a.c. sets, transmitting tubes, and special tubes for regulating purposes.

The numbers themselves are the ones by which the tubes are most familiar to us. For the moment we have dropped the somewhat cumbersome "Type '00" system which is necessitated by the fact that some manufacturers use some other figure than "2" or "8" for the three-digit numbers. So in using the table this should be kept in mind — for instance, a "224-A" is the same thing as an Arcturus "124-A" or a DeForest "424-A." Incidentally, the 224 is now obsolete, the 224-A having replaced it. The only difference between the two is that the latter reaches its operating temperature a great deal more quickly than the 224 did.

While banging this out on the old mill we're breathing a silent prayer that the barrage may let up long enough to make this table useful for a few months at least.

Type No.	Description ¹	Filament ² Voltage	Base ³	Remarks ⁴
WD-11 WX-12	General-purpose triode (r)	1.1 d.c.	WD 4-pin med. 4-pin	
41	Pentode power amplifier (r)	6.3 a.c. or d.c.*	med. 6-pin	Sept. 1932
42	Pentode power amplifier (r)	6.3 a.c. or d.c.*	med. 6-pin	Sept. 1932
43	Pentode power amplifier (r)	25.0 d.c.*	med. 6-pin	Sept. 1932
44	Variable-mu pentode screen-grid r.f. amplifier (r)	6.3 a.c. or d.c.*	sm. 5-pin with cap	Sept. 1932
46	Double-grid power amplifier (r)	2.5 a.c.	med. 5-pin	May 1932
49	Double-grid power amplifier (r)	2.0 d.c.	med. 5-pin	Aug. 1932
52	Double-grid power amplifier (r)	6.3 d.c.	med. 5-pin	Sept. 1932
55	Twin-diode detector, triode amplifier (r)	2.5 a.c.*	sm. 6-pin with cap	Sept. 1932
56	General-purpose triode (r)	2.5 a.c.*	sm. 5-pin	June 1932
57	Screen-grid pentode r.f. amplifier (r)	2.5 a.c.*	sm. 6-pin with cap	June 1932

This List Has Been Continued on page 38 to Permit Removing for Permanent Mounting

F.R.C. Absorbs Radio Division

THE Radio Division of the Department of Commerce is no more. On July 20th its duties and its personnel and monies were transferred to the Federal Radio Commission by order of President Hoover, in compliance with a requirement of the so-called Economy Act relating to the consolidation of government bureaus.

The Commission immediately established a new section of its activities, known as the Division of Field Operation, and put all the Radiv personnel in the new division, headed by Mr. William D. Terrell, the well-known director of the Department of Commerce's Radio Division these many years. All of the functions of the Radiv are now lodged in the Commission. All of the Department of Commerce regulations governing operator licenses, etc., are continued in force by the Commission until further notice.

Thus ends an interesting chapter in the Washington radio picture. After seventeen years of radio administration under the Bureau of Navigation of the Commerce Department, the act of 1927 created the F.R.C. and lodged many administrative functions with the latter. At first, however, it was contemplated that the F.R.C. should function for but a single year, to straighten out the broadcasting mess, after which it was to revert to appellate status, its functions then to return to the Secretary of Commerce. For this reason Commerce's place in the machinery of administration was continued. The year ended, but the active life of the Commission was first continued another year and then made permanent. Meanwhile the Secretary of Commerce retained authority over operator licensing, the inspection of stations and the enforcement of regulations — work which was carried on by the Radio Division, by now an independent branch of the department. Thus was created accidentally the divided authority which so many have found hard to understand. For years friends of the Commission endeavored to get the Radiv transferred to them, and although this was voted on several occasions by the Senate, the House would have none of it. Opponents of the Commission in fact introduced bills paraphrasing every sentence of the transfer measures but providing for the transfer of the Commish, lock, stock and barrel, to the Department of Commerce! So the matter hung, without solution, until finally the

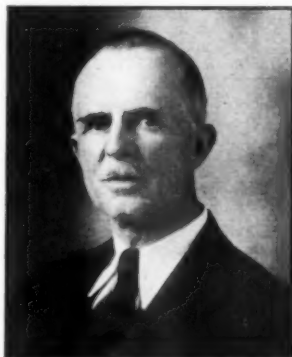
wave of congressional economy accomplished it. Hereafter we have just one Washington radio administrative agency, the F.R.C.

Mr. W. D. Terrell, chief of the new Division of Field Operation, is the veteran radio administrator of America. The first employe of the government under the Wireless Ship Act of 1910, he had charge of station inspection on the whole Atlantic coast! Becoming chief inspector, he was the chief supervisor during all those years that administration under the 1912 law resided with the Bureau of Navigation — years in which he was the country's highest radio official and to whom we amateurs always took our problems. Since the Commission took over station licensing in 1927 his organization has been a separate radio division, and he as director has been in charge of

the field force of supervisors and inspectors in their work of inspecting, enforcing, and examining and licensing operators. This work he now continues under the Commission. He is the staunchest official friend of the radio amateur it has ever been our pleasure to know. On occasions much too numerous to list, he has been right in the thick of a fight, upholding and supporting the amateurs who, from his intimate experience in administration, he well knew were of immense value to the nation. No more loyal champion have we ever had!

Mr. Terrell addressed the Atlantic Division convention in Washington in middle June, at which time he reported that his latest figures showed there to be 31,859 licensed amateur stations in the country, an increase of about forty percent in the past year!

K. B. W.



MR. WILLIAM D. TERRELL
Director of the new Division of Field
Operation, Federal Radio Commission.

Strays

Technical bulletins on new 2.5- and 6.3-volt Sylvania tubes are available to readers of *QST*. These bulletins contain descriptions and average characteristics of the following types: 29 (a double-grid detector), 46, 56, 57, 58, 82, 36, 37, 41, 42, 44, and 69. Requests should be addressed to Walter R. Jones, Commercial Engineer, Hygrade Sylvania Corp., Emporium, Penna. Bulletins on the 85 and 55 are now in preparation and will be mailed on request as soon as released.

(Continued from page 36)

Type No.	Description ¹	Filament ² Voltage	Base ³	Remarks ⁴
58	Variable-mu screen-grid pentode r.f. amplifier (r)	2.5 a.c.*	sm. 6-pin with cap	June 1932
82	Full-wave mercury-vapor rectifier (r)	2.5 a.c.	med. 4-pin	May 1932
83	Full-wave mercury-vapor rectifier (r)	5.0 a.c.	med. 4-pin	Sept. 1932
85	Twin-diode detector, triode amplifier (r)	6.3 d.c.*	sm. 6-pin with cap	Sept. 1932
89	Triple-grid power amplifier (r)	6.3 d.c.*	sm. 6-pin with cap	Sept. 1932
112-A	General purpose triode (r)	5.0 d.c.	med. 4-pin	
120	Triode power amplifier (r)	3.0 d.c.	sm. 4-pin	
171-A	Triode power amplifier (r)	5.0 d.c.	med. 4-pin	
199	General-purpose triode (r)	3.0 d.c.	sm. 4-pin	
200-A	Triode detector (r)	5.0 d.c.	med. 4-pin	
201-A	General-purpose triode (r)	5.0 d.c.	med. 4-pin	
203-A	100-watt oscillator and power amplifier (t)	10.0 a.c.	lge. 4-pin	
204-A	250-watt oscillator and power amplifier (t)	11.0 a.c.	special	
210	Triode power amplifier (r) and 75-watt oscillator (t)	7.5 a.c.	med. 4-pin	Sept. 1926
211	Modulator and 75-watt oscillator (t)	10.0 a.c.	lge. 4-pin	
217-A	Half-wave rectifier, 1500v. (t)	10.0 a.c.	lge. 4-pin	
217-C	Half-wave rectifier, 3000v. (t)	10.0 a.c.	lge. 4-pin with cap	
222	Screen-grid r.f. amplifier (r)	3.3 d.c.	med. 4-pin with cap	Dec. 1927
224-A	Screen-grid r.f. amplifier (r)	2.5 a.c.*	med. 5-pin with cap	June 1929
226	Triode amplifier (r)	1.5 a.c.	med. 4-pin	
227	General purpose triode (r)	2.5 a.c.*	med. 5-pin	
230	General purpose triode (r)	2.0 d.c.	sm. 4-pin	July 1930
231	Triode power amplifier (r)	2.0 d.c.	sm. 4-pin	July 1930
232	Screen-grid r.f. amplifier (r)	2.0 d.c.	med. 4-pin with cap	July 1930
233	Pentode power amplifier (r)	2.0 d.c.	med. 5-pin	June 1931
234	Variable-mu pentode screen-grid r.f. amplifier (r)	2.0 d.c.	med. 4-pin with cap	July 1932
235	Variable-mu screen-grid r.f. amplifier (r)	2.5 a.c.*	med. 5-pin with cap	May 1931
236	Screen-grid r.f. amplifier (r)	6.3 d.c.*	sm. 5-pin with cap	July 1931
237	General-purpose triode (r)	6.3 d.c.*	sm. 5-pin	July 1931
238	Pentode power amplifier (r)	6.3 d.c.*	sm. 5-pin with cap	July 1931
239	Variable-mu pentode screen-grid r.f. amplifier (r)	6.3 d.c.*	sm. 5-pin with cap	Feb. 1932
240	Triode voltage amplifier (r)	5.0 d.c.	med. 4-pin	Apr. 1927
245	Triode power amplifier (r)	2.5 a.c.	med. 4-pin	June 1929
247	Pentode power amplifier (r)	2.5 a.c.	med. 5-pin	June 1931
250	Triode power amplifier (r) and modulator (t)	7.5 a.c.	med. 4-pin	Apr. 1928
280	Full-wave rectifier (r)	5.0 a.c.	med. 4-pin	
281	Half-wave rectifier (r and t)	7.5 a.c.	med. 4-pin	
841	Triode voltage amplifier (r and t)	7.5 a.c.	med. 4-pin	July 1929
842	Triode modulator (t)	7.5 a.c.	med. 4-pin	July 1929
843	Triode power amplifier and oscillator (t)	2.5 a.c.*	med. 5-pin	
844	Screen-grid power amplifier (t)	2.5 a.c.*	med. 5-pin with cap	
845	Triode modulator (t)	10.0 a.c.	lge. 4-pin	Nov. 1929
849	Triode 450-watt oscillator or r.f. amplifier; 100-watt modulator (t)	11.0 a.c.	special	Handbook

Type No.	Description ¹	Filament ² Voltage	Base ³	Remarks ⁴
830	100-watt screen-grid r.f. amplifier (t)	10.0 a.c.	lge. 4-pin with cap	
831	1000-watt triode amplifier and oscillator (t)	11.0 a.c.	special	
832	100-watt triode oscillator and amplifier (t)	10.0 a.c.	med. 4-pin with sp. bulb connec.	May 1927
860	100-watt screen-grid amplifier (t)	10.0 a.c.	med. 4-pin with sp. bulb connec.	Sept. 1928
861	500-watt screen-grid amplifier (t)	11.0 a.c.	special	Feb. 1929
864	General-purpose triode, non-microphonic (r)	1.1 d.c.	sm. 4-pin	
865	7.5-watt screen-grid amplifier (t)	7.5 a.c.	med. 4-pin with cap	Apr. 1929
866	Half-wave mercury-vapor rectifier (t)	2.5 a.c.	med. 4-pin with cap	Feb. 1929
868	Phototube		sm. 4-pin	
871	Half-wave mercury-vapor rectifier (t)	2.5 a.c.	sm. 4-pin with cap	
872	Half-wave mercury-vapor rectifier (t)	5.0 a.c.	lge. 4-pin with cap	
874	Voltage regulator		med. 4-pin	Jan. 1927
876	Current regulator		mogul	
886	Current regulator		mogul	
896	Current regulator		std. lamp-base	

SPECIAL TYPES

DeForest 571	500-watt oscillator and r.f. amplifier (t)	11.0 a.c.	special	Large-size 852
DeForest 575	Half-wave mercury-vapor rectifier (t)	5.0 a.c.	lge. 4-prong	12,500 v. inv. peak
ER-LA	Pentode power amplifier (r)	6.3 d.c.	med. 5-prong	May 1932
Triad sp. 210	Special 210 for ultra-high frequencies (t)	7.5 a.c.	med. 4-prong with cap	June 1932
Speed 295	Detector-power amplifier (r)	2.5 a.c.*	med. 5-prong with cap	Sept. 1932
Wunderlich	Detector	2.5 a.c.*	med. 5-prong with cap or med. 6-prong	Sept. 1932
Recto-bulb R3	Half-wave mercury-vapor rectifier	10.0 a.c.*	med. 4-prong with cap	
Recto-bulb R4	Half-wave mercury-vapor rectifier	5.0 a.c.*	med. 4-prong with cap	

WESTERN ELECTRIC TRANSMITTING TUBES⁵

211-D	Modulator and 50-watt oscillator (t)	10.0 a.c.	lge. 4-prong	
212-D	Modulator and 250-watt oscillator (t)	14.0 a.c.	special	
242-A	Modulator and 50-watt oscillator (t)	10.0 a.c.	lge. 4-prong	(Similar to UV-211)
248-A	Modulator and 50-watt oscillator (t)	10.0 a.c.	lge. 4-prong	(Similar to 211-D)
251-A	1000-watt oscillator (t)	10.0 a.c.	special	
261-A	Modulator and 50-watt oscillator (t)	10.0 a.c.	lge. 4-prong	(Similar to 242-A)
270-A	Modulator and 300-watt oscillator or amplifier (t)	10.0 a.c.	special	
276-A	Modulator or 50-watt oscillator and amplifier (t)	10.0 a.c.	lge. 4-prong	
279-A	Modulator or 1000-watt oscillator and amplifier (t)	10.0 a.c.	special	

¹ (r) receiving; (t) transmitting.

² Indirectly-heated cathode. In general, any tube marked with * can be used on either a.c. or d.c. filament supply.

³ sm., small; med., medium; lge., large.

⁴ Dates refer to the issue of *QST* in which a more complete description of the tube will be found.

⁵ Western Electric transmitting tubes listed are available to amateurs for radio-telephone use only.



STRAYS



Attention, 56-Mc. Experimenters

WEDNESDAY, August 31st, should be a big day for 56 mc. in the north-eastern part of the country. All amateurs on this band are asked to keep an ear open for W10XN, the experimental station of John M. Wells, to be operated in an autogyro flying in the vicinity of Mount Washington. The frequency of the transmitter will be immediately outside the high-frequency end of the amateur band and every attempt will be made to contact with distant amateurs. The plane is part of the equipment of an eclipse expedition which includes several Headquarters' men. The ground station of this expedition (on 56 mc.) will be located at Pinkham Notch, in the vicinity of Mount Washington. No exact schedule of operating times has been planned. Both the plane and the ground stations will be on the air, however, during most of the day.

It seems that a certain far-West broadcasting station was, one Sunday morning, broadcasting by remote control the services from a local church. Trouble developed and the line suddenly went dead. The technician called the announcer and told him to put on a record as soon as he could. The announcer grabbed the first record that he came to and slapped it on the air. It was "The Substitute Parson," by Chick Sale!

Another hot one for the book:

WIEAU closed out of domicile by landlord who raised the rent ten dollars per month for maintaining a ham station in the said residence.

During Secretary Warner's absence in Madrid, Lyle Budlong becomes the Acting Secretary of the League, Ross Hull the Editor of *QST* and the *Handbook*, and Dave Houghton the Business Manager of Publications. Warner and Segal may be away until December. Meanwhile Vice-President Stewart is back on the firing line, with a watchful eye on Washington developments.

W4AKI says he's going to save his old QSL cards after seeing that Ham-ad in June *QST*: "QSL complete, 1925 to date, \$15"!

We wonder how many 5-meter enthusiasts have seen, *Below Ten Meters*, a 64-page book in which is gathered together the meat of practically all the contemporary literature on ultra-high-frequency work. The contents include chapters on ultra-high-frequency oscillators, radiating systems, receivers, theories, measurements, television reception and other pertinent subjects, abundantly illustrated with photographs and diagrams. Highly interesting reading, even if you're not an active participant in the ultra-high-frequency experimenting now being carried on by amateurs. The book is produced by the National Company but is decidedly *not* a catalog.



© Harris & Ewing

EVER WONDER WHAT THE F.R.C. LOOKS LIKE?

Federal Radio Commission. . . . You bet you've heard of it, but did you ever see it? Here it is, in its newest photograph. The five commissioners sit at the table. Left to right: Col. Thad H. Brown, newest member, former general counsel; Harold A. Lafount; Major General C. McK. Saltzman, chairman (now resigned); Judge Eugene O. Sykes; W. D. L. Starbuck. Standing are the commission's three division chiefs. Left to right: James W. Baldwin, secretary; Dr. C. Byron Jolliffe, chief engineer; Duke M. Patrick, general counsel.

The entire staff of the commission totals something like 120 people, occupies an entire floor in a very large building. The Radio Division, Department of Commerce, in process of transfer to the commission's establishment, numbers about that many more, but most of these are the field personnel at the various district offices. All in all, radio administration in this country requires several hundred people, costs a million a year.

Standard Frequency Notes and Schedules

EVENING transmissions of W1XP shifted from Fridays to Wednesdays—early morning “BX” schedule of W6XK starting at 6:00 a.m. instead of 4:00 a.m., P.S.T.—W6XK transmitting an additional 3500-ke. “A” schedule in place of a former 14-mc. “C” schedule. These are changes in s.f. routine that have been made recently. The shift of W1XP evening transmissions from Fridays to Wednesdays, made necessary by local conditions at Round Hill, will add diversity to the transmissions of the system as a whole and should prove beneficial to users who have found Friday nights inconvenient. The later morning transmissions from W6XK, requested by Australasian users, should increase their utility both in foreign parts and on this continent. And the addition of a 3500-ke. band “A” schedule to W6XK’s fare will meet a demand from the Pacific Coast gang

furnishing two separate ‘A’ supplies, are contained within the common cabinet.” This is giving the frequency measuring gadgets well-deserved consideration, we’d say.

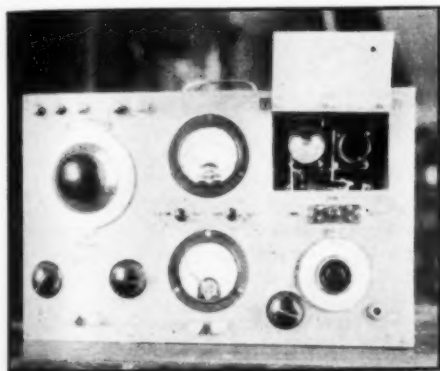
And from another s.f. report, received from C. E. Marsh, Modesto, Calif., we glean this one. “Fifteen minutes before s.f. broadcast noticed that dynatron coil was loose on form. Swore, tore into things, emerged with new coil in place — and 30 seconds to spare.” So, with such never-say-die spirit of the Old West still with us, we dig into the following schedules, fighting as may be necessary.

DATES OF TRANSMISSIONS

Date	Schedule	Station
August 31, Wednesday	BB	W1XP
September 2, Friday	B	W9XAN
	A	W6XK
September 4, Sunday	C	W9XAN
September 7, Wednesday	B	W1XP
September 9, Friday	BB	W6XK
	A	W9XAN
September 10, Saturday	BX	W6XK
September 11, Sunday	BB	W9XAN
	C	W6XK
September 16, Friday	A	W6XK
September 18, Sunday	C	W1XP
September 21, Wednesday	A	W1XP
September 23, Friday	B	W9XAN
	B	W6XK
September 28, Wednesday	BB	W2XP
September 30, Friday	B	W9XAN
	A	W6XK
October 2, Sunday	C	W8XAN
October 5, Wednesday	B	W1XP
October 7, Friday	BB	W6XK
	A	W9XAN
October 8, Saturday	BX	W6XK
October 9, Sunday	BB	W9XAN
	C	W6XK
October 14, Friday	A	W6XK
October 16, Sunday	C	W1XP
October 19, Wednesday	A	W1XP
October 21, Friday	B	W9XAN
	B	W6XK
October 26, Wednesday	BB	W1XP
October 28, Friday	B	W9XAN
	A	W6XK
October 30, Sunday	C	W9XAN

STANDARD FREQUENCY SCHEDULES

Time (p.m.)	Evening Sched. and Freq. (kc.)		Time (p.m.)	Afternoon Sched. and Freq. (kc.)	
	A	B		BB	C
8:00	3500	7000	4:00	7000	14,000
8:08	3600	7100	4:08	7100	14,100
8:16	3700	7200	4:16	7200	14,200
8:24	3800	7300	4:24	7300	14,300
8:32	3900		4:32		14,400
8:40	4000				
			Morning Sched. & Freq. (kc.)		
			Time (a.m.)	BX	
			6:00	7000	
			6:08	7100	
			6:16	7200	
			6:24	7300	



THE FREQUENCY METERING AND MONITORING UNIT BUILT BY W2AJA-W3BXB

The dynatron oscillator occupies the left side and the monitor the right, the hinged front cover providing easy access to monitor tube and coil.

for more transmissions locally useful. Increasingly numerous requests for s.f. reporting cards (furnished gratis by Hq.) and the growing volume of reports indicate heavy activity with the coming season. Now is the time to get set, overhaul the old frequency meter or, lacking such, complete the station by building a new one.

As an excellent example of frequency-measuring and monitoring equipment for the thorough-going amateur, consider the unit built by Theodore H. Kemp, W2AJA-W3BXB, illustrated herewith. “The instrument,” writes OM Kemp, “consists of an unshielded dynatron oscillator and a shielded monitor with a hinged cover over the monitor tube and plug-in coil. Both units are mounted on a 3 1/4-inch aluminum panel. All batteries, 67.5 volts ‘B’ and 4 dry cells

The time specified in the schedules is local standard time of the transmitting station. W1XP uses Eastern Standard Time, W9XAN, Central Standard Time, and W6XK, Pacific Standard Time.

TRANSMITTING PROCEDURE

The time allotted to each transmission is 8 minutes, divided as follows:

2 minutes — QST QST QST de (station call letters).

3 minutes — Characteristic letter of station followed by call letters and statement of frequency. The characteristic letter of W1XP is "G"; that of W9XAN is "O"; and that of W6XK is "M."

1 minute — Statement of frequency in kilocycles and announcement of next frequency.

2 minutes — Time allowed to change to next frequency.

ACCURACY

Although the accuracy of the transmissions is not guaranteed, those of W1XP are usually dependable to 0.001 per cent and those of W9XAN and W6XK to 0.01 per cent.

THE TRANSMITTING STATIONS

W1XP: Massachusetts Institute of Technology, Round Hill Research, South Dartmouth, Mass., Howard A. Chinn in charge.

W9XAN: Elgin Observatory, Elgin National Watch Company, Elgin, Ill., Frank D. Urie in charge.

W6XK: Don Lee Broadcasting System, Los Angeles, Calif., Harold Peery in charge.

REPORT BLANKS

Blanks for reporting on the S.F. transmissions will be sent postpaid upon request. Just send a card or message to Standard Frequency System, QST, West Hartford, Conn., asking for s. f. blanks.

WWV 5000-KC. TRANSMISSION

The 5000-kc. transmissions of the Bureau of Standards station, WWV, are given every Tuesday from 2:00 to 4:00 p.m. and from 10:00 p.m. to midnight, E.S.T. The accuracy of these transmissions is to better than 1 cycle (one in five million). Information on how to receive and utilize the signals is given in Letter Circular LC-335, obtainable on request from the Bureau. Communications concerning these transmissions and reports on their reception should be addressed to Bureau of Standards, Washington, D. C.

— J. J. L.

ELECTION NOTICES

To all A.R.R.L. Members residing in the CENTRAL, HUDSON, NEW ENGLAND, NORTHWESTERN, ROANOKE, ROCKY MOUNTAIN and WEST GULF Divisions of A.R.R.L.:

1. You are hereby notified that an election for an A.R.R.L. Director, for the 1933-1934 term, is about to be held in each of the above divisions, in accordance with the constitution. Your attention is invited to Sec. 1 of Article IV of the con-

stitution, providing for the government of A.R.R.L. by a board of directors; Sec. 2 of Article IV, defining their eligibility; and By-Laws 10 to 19, providing for their nomination and election. Copy of the constitution and by-laws will be mailed any member upon request.

2. Voting will take place between November 1 and December 20, 1932, on ballots which will be mailed from the headquarters office in the first week of November. The ballots for each division will list the names of all eligible candidates nominated by A.R.R.L. members residing in that division.

3. Nomination is by petition. Nominating petitions are hereby solicited. Ten or more A.R.R.L. members residing in any one division have the right to nominate any member of the League in that division as a candidate for director therefrom. The following form for nomination is suggested:

(Place and date)

Executive Committee,
American Radio Relay League,
West Hartford, Conn.

Gentlemen:

We, the undersigned members of the A.R.R.L. residing in the Division, hereby nominate of as a candidate for director from this division for the 1933-1934 term.

(Signatures and addresses)

The signers must be League members in good standing. The nominee must be a League member in good standing and must be without commercial radio connections. His complete name and address should be given. All such petitions must be filed at the headquarters office of the League in West Hartford, Conn., by noon of the first day of November, 1932. There is no limit on the number of petitions that may be filed, but no member shall append his signature to more than one petition.

5. Present directors from these divisions are as follows: *Central*, Mr. Loren G. Windom, W8GZ-W8ZG, Columbus, Ohio; *Hudson*, Mr. A. Lafayette Walsh, W2BW, New York, N. Y.; *New England*, Mr. G. W. Bailey, W1KH, Weston, Mass.; *Northwestern*, Mr. K. W. Weingarten, W7BG, Tacoma, Wash.; *Roanoke*, Mr. W. Tredway Gravely, W3BZ, Danville, Va.; *Rocky Mountain*, Mr. Russell J. Andrews, W9AAB, Denver, Colo.; *West Gulf*, Mr. Frank M. Corlett, W5ZC, Dallas, Tex.

5. These elections are the constitutional opportunity for members to put the man of their choice in office as the representative of their division. Members are urged to take the initiative and file nominations immediately.

For the Board of Directors:

A. L. BUDLONG, Acting Secretary
West Hartford, Conn., 15 August 1932.

for the EXPERIMENTER



The Short Receiving Antenna

IN searching for a means of cutting down the signal-to-noise ratio in an amateur receiver, I have been experimenting with the circuit shown in Fig. 1.

We all know that the shorter the receiving antenna the better the signal-static ratio, but the use of a very short antenna means a loss in signal strength. I connect an antenna, cut to the length which gives the proper amount of grid damping, directly to the grid of a tube used in a plain re-

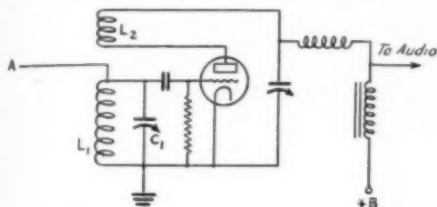


FIG. 1—SHORT ANTENNA FOR GRID DAMPING AS USED BY W1ADF

For the 3500-kc. band the antenna, A, is approximately seven feet long. Other lengths will be required for the other bands. C₁ is a 5-plate midjet, L₁ has 20 turns on a tube base and L₂ 15 turns on the same tube base. These approximate specifications are for 3500 kc.; the exact number of turns must be determined experimentally for this and other bands.

generative detector circuit. With this arrangement, the signal strength is practically the same as when a long antenna is used in the ordinary manner. For some types of static the ratio is quite noticeably improved, while for other types the improvement is only slight.

If a regenerative detector designed for use with the ordinary antenna is tried, it will be necessary to rebuild the tuning coil for this method of grid loading. To date I have not had much success in applying this principle to tuned radio frequency amplifiers, which as in the case of the regenerative detector must have a redesigned tuning coil.

The house lighting system and the transmitting antenna system interact with the short antenna, so it is best to keep it as far away from both as possible.

—Howard F. Barkley, W1ADF

Another Band-Spread Arrangement

The use of a tapped receiving coil with the tuning condenser connected across only part of it

for band-spreading has been revived recently and has been used in several receivers described in *QST*. One of the problems it has brought up is that of finding room for an extra contact on already-crowded coil forms. Here is how Vern Milton, W6EPW, solved it:

"Upon completion of a new receiver recently I found that I had far too much band spread on 80 and not enough on 40. Not having any UY sockets on hand, I had to figure out a way to get band spread using UX sockets and a large condenser. The circuit of Fig. 2 is the one finally adopted. It will be noted that the rotor plates of the tuning condenser, C₁, instead of being connected to one side of the coil go to the filament. This allows use of the circuit without insulating the condenser from the metal panel and at the same time it simplifies the circuit and reduces the hand-capacity effect.

"This is the only circuit I have ever seen that allows band spread with a condenser having but one section and with coils on four-prong bases. A few other desirable qualities are that the set oscillates with ease on all bands, there is less frequency drift than with the ordinary circuit — the

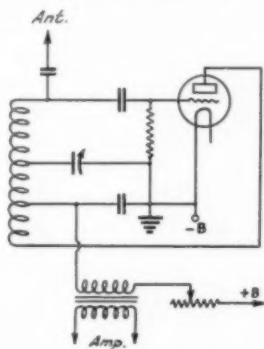


FIG. 2—TAPPED-COIL METHOD OF BAND-SPREADING WITH 4-PRONG COIL FORMS

set will stay at one frequency even with quite a change in plate voltage, which is an advantage when using a 'B' eliminator — and the noise level is decreased in favor of the signal.

"Although this set was used with d.c. tubes the circuit could be changed easily for a.c. operation. It should be very good for use in a portable receiver, since a single-pole double-throw switch with the blade connected to the stator plates of

the tuning condenser and one contact at the grid end of the coil and the other at the tap will permit either band-spread tuning or a large coverage with the same coil. This will cut down the number of coils needed."

More on 'Phone Break-in

Following is a description of a break-in system that has been developed from the one suggested on page 13 of July *QST*. This system seems to work perfectly, and has the decided advantage that the time lag of the transmitter can be controlled to suit the operating conditions.

When the microphone is spoken into there is, of course, audio frequency energy in the line marked "To Modulator" in Fig. 3. A small part of this alternating current goes through the audio transformer and to the 245 tube (any two- or three-element tube will work as well). This tube

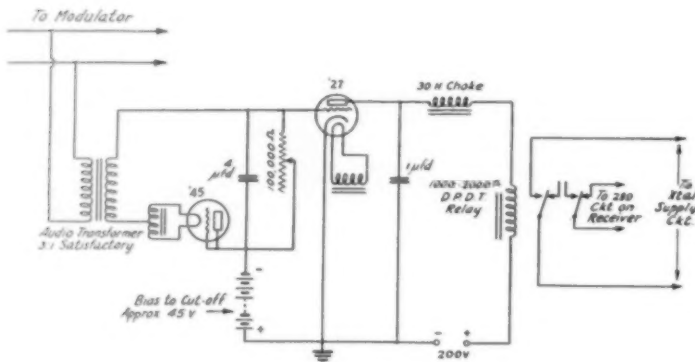


FIG. 3 — 'PHONE BREAK-IN SYSTEM USING A '27 CONTROL TUBE

acts as a half-wave rectifier and charges the 4-μfd. condenser. The '27 control tube is biased to cut-off and normally no current is drawn by its plate. The charge on the 4-μfd. condenser bucks the bias and allows current to flow through the relay winding in the plate circuit of the '27. At this stage the receiver is made inoperative and the carrier is thrown on the air. With a good relay all this takes place in approximately 1/20 second and the first part of the first word is not lost appreciably.

The adjustment of the 100,000-ohm variable resistor determines the length of time the charge will remain on the 4-μfd. condenser after voice excitation ceases. The transmitter can be made to hang on between words up to several seconds if the operator wishes. Usually 1 to 1½ seconds will be found desirable. With the 100,000-ohm resistor half open the condenser will lose its charge in about that time. As stated before, however, this can be varied over wide limits.

The following relays were tried and worked well: A Benjamin "Telicod" relay, 1000 ohms;

a Western Electric telephone relay; a Ward-Leonard keying relay (110 volts a.c.); and a Struthers-Dunn "Dunco" relay.

If desired, the d.o.d.t. relay could be eliminated by substituting the crystal circuit or master oscillator at that point and working out some scheme to overbias the receiver when the carrier is on. This scheme, I understand, is being used by G. E. on their carrier-current transmitters. It is much more complicated than the arrangement proposed here, however.

— Philip Stout, W4AAD

Amplifier Coupling

In radio-frequency power amplifier operation ample grid excitation to any tube is an essential factor for proper operation. Yet, if the preceding tube is larger than necessary all of the power over

that actually needed to swing the grid of the following tube is wasted.

There are occasional instances when one tube is not quite large enough to supply the necessary grid power to excite adequately the following tube. While two tubes of the same type would do the work nicely, many of us hesitate to put two tubes of any type in parallel at the higher frequencies on account of the increased tube capacities and the possibilities of parasitic oscillations.

We can illustrate the above by taking the case of a c.w. transmitter utilizing a 204-A in the final power amplifier stage. Let us assume that the only tubes on hand are 210's. One tube alone will

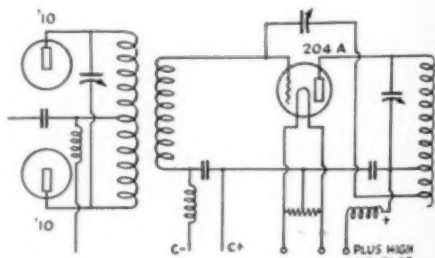


FIG. 4 — INDUCTIVE COUPLING BETWEEN A PUSH-PULL EXCITER AND SINGLE-ENDED AMPLIFIER

hardly give enough power to excite the 204-A fully. However, two 210 tubes will just about do the work efficiently.

The only alternative to parallel operation is to use push-pull. But here is the snag in the problem: the push-pull output stage must work into a single-ended amplifier using a relatively high-power tube. The circuit shown in Fig. 4 is a very simple solution. Inductive coupling between amplifier stages is nothing new, but its application in this instance may not be familiar to all amateurs.

The circuit shown is very easy to make work, and while the illustration deals specifically with 210's and a 204-A, many other tube combinations suggest themselves. The circuit may be used whether the final amplifier is a straight r.f. amplifier for c.w. or a linear amplifier in a radio-telephone transmitter. This circuit will prove particularly effective on the 7000- and 14,000-kc. bands.

— Everett L. Dillard, W9BKO

A Novel Thermometer

Fig. 5 is the diagram of a new type of thermometer for crystal heater ovens. It has, instead of a mercury or spirit indicator, a galvanometer

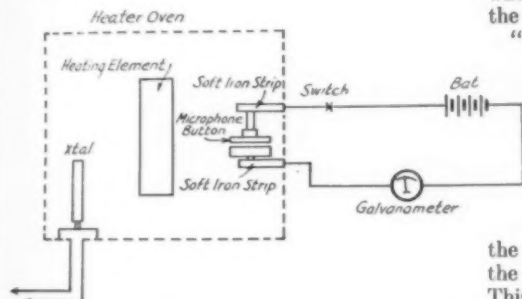


FIG. 5 — MICROPHONE-BUTTON THERMOMETER FOR CRYSTAL OVENS

actuated by a carbon button, such as can be taken from an old telephone microphone.

The carbon button is mounted between two pieces of soft iron or some other similar metal, as shown, and connected in series with a battery and a galvanometer or low-range milliammeter.

The mounted button is then placed in the oven, and the thermometer is ready to use. When the heater oven is turned on, the heat expands the soft iron and the resulting pressure on the button lowers its resistance. This in turn makes the meter register more current. The thermometer can easily be calibrated, and this gives a fairly accurate measure of the oven temperature.

— Robert P. Gutterman, W1DHY-W1ENM

Electrical Interference

"Static" set up by electrical machinery is often one of the worst enemies to decent reception, and

it is not always easy to cure even when the orthodox methods, which seem to be logical enough, are applied. Some of the noise is only indirectly caused by the appliances which may be under suspicion, as the letter below from Rupert R. Crum, W7ADF, points out. Maybe some of his suggestions will give you an idea in taking the bite out of your pet noise-maker.

"I wonder if many know that a great deal of noise can come from an electric motor in operation that is *not* caused by dirty brushes, bad commutator, or grounds in the wiring of the motor, and also that this noise cannot be filtered with all the condensers and chokes in the country.

"One common source of such noise is a static charge built up on the motor frame by friction from belt slippage and also by induction from the motor field winding. To create a noise this charge may be leaking to ground through the motor base bolts by potential discharge or through a vibrating ground contact. Such a contact or vibrating ground may exist a good many feet from the actual motor location, or may be in the conduit joints of the building wiring. It may be a leak to actual dirt ground through the floor or through water piping as far away as the *third* floor of the building.

"When looking for these grounds, shake *all* water piping and gas piping, and even the stovepipe if one is around. The number of loose joints that can be found is surprising, and at times to all appearances the offending pipe is not even close to an electrical circuit. I know of one case where the radio receiver in question gave an excellent imitation of Niagara Falls when the people in the neighboring house drew a glass of water, yet the neighbor's house was at least 150 feet away. This was cured by moving the radio ground-rod about four feet farther out in the yard.

"To be noisy, a conduit does not have to have a motor on the end of its service wires — all it needs is an electrical load. The heavier the load the worse the noise, usually. Conduit carrying higher voltages than normal is also more likely to cause noise; taking 110 volts as normal, 220- and 440-volt lines are proportionately worse offenders.

"Another thing: the grounding terminal picture on a filter diagram means grounding on the offending motor's *frame*; after this is done run another wire to a water pipe or driven ground if you wish."

Remote Control

With the increasing popularity of remote control a simple system of control that not only is dependable and inexpensive, but easy to construct from stock parts, becomes desirable. The system to be described is not only cheap and fool-proof, but has given several years service controlling

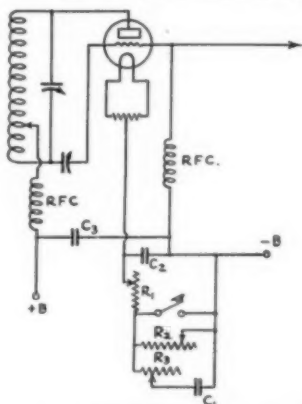
There are three relays in the control circuits, a keying relay, a delay mechanism, and the necessary switches and current supply. The current supply used is an old "A" eliminator, which gives good service in spite of its variable voltage. The two relays, A (normally open) and B (normally closed), are rewound Brach Controls, and Relay C, a 15-mil. affair, is made from an old filter choke. A '27 tube with its filament adjusted to heat a little slower than the 866 filaments is the heart of the delay mechanism. The circuit diagram, Fig. 6, is self-explanatory.

If by mistake you should start keying before the 866 filaments were hot or did anything else wrong, no damage would result because the plate power is not on until the rectifier is ready for it.¹

mounted in a 9" by 12" 4-inch steel cutout box, with all wiring in "BX."

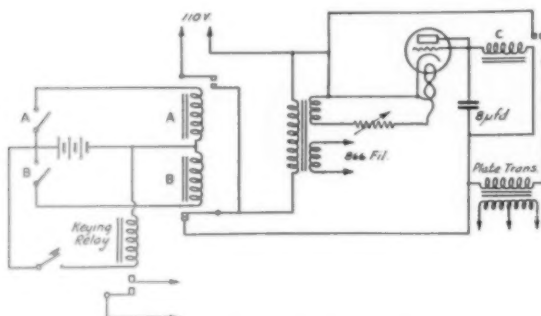
— Ronald L. Ives, 32 Laurel Pl.,
Upper Montclair, N. J.

The circuit of Fig. 7 is used at W8FHA to obtain automatic grid bias, blocked grid keying, and



R_1 —10,000 ohms, variable, 80-watt size.
 R_2 —100,000 ohms, variable, 50-watt size.
 R_3 —500 ohms, variable, 10-watt size.
 C_1 —1 ufd.
 C_2 —.01 ufd.
 C_3 —Usual plate by-pass condenser.
 Other constants same as in ordinary amplifier.

Other constants same as in ordinary amplifier practice.



trouble from dust, mechanical damage, and Underwriters inspectors. The outfit illustrated in the photograph was made in one afternoon and is

¹ A similar scheme for using a '27 as a time-delay tube also has been received from Frank Fullaway, K6CFQ, who points out that the one defect of the system is that the '27 takes just about as much time to cool off as it does to heat, and therefore if the main switch is opened and closed again within a few seconds the plate power will come on at the same time as the rectifier filament power. Once the main switch is opened the '27 must be allowed to cool before the system will again give the desired protection to the rectifier filaments.

also thump elimination in the amplifier stage of an m.o.p.a. The r.f. part of the circuit is quite conventional. In the keying system R_1 is adjusted with the key down until the voltage drop across it is sufficient to bias the grids to the proper value. R_2 is then adjusted with key up until the plate current drops to zero or cutoff; then with the key down it will be shorted out. R_3 is adjusted for minimum sparking at the key contacts and also eliminates any stray chirps or thumps. C_1 is one microfarad and must be capable of withstanding the plate voltage as must also be by-pass condenser C_2 , which is .01 μ f. When R_1 is capable of carrying enough current the thing also makes a beautiful rig to reduce power. This circuit has been in use for quite a while at this station on a single 210 amplifier, and is now working in a push-pull 210 amplifier rig.

—E. V. Qualman, W8FHA

Strays

While visiting W4ASV, W4MS noticed that W4ASV was using two 201-A's in his push-pull transmitter and a 210 as a detector in his receiver!



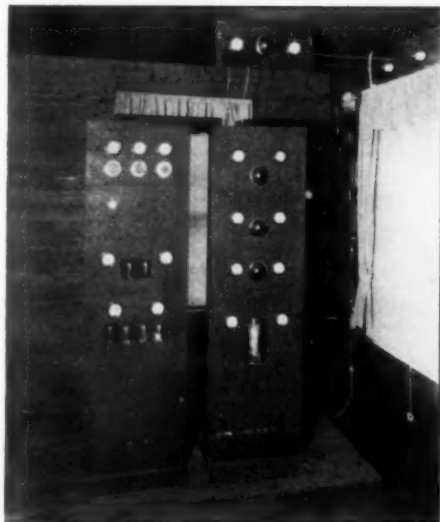
Amateur Radio STATIONS



W5ANW, Houston, Texas

W5ANW is a 250-watt station owned by William H. Carter, Jr., 2612 Oakdale Avenue, Houston, Texas. The photographs show views of the operating desk and the two panels which comprise the power supply and the transmitter. The power supply unit, on the left, includes a filament control panel at the top, a relay panel with indicator lamps, and two rectifier systems which supply all the plate power to the tubes in the transmitter. Two separate d.c. supplies are used, one furnishing 350 volts to the crystal oscillator and 900 volts to the buffer amplifier; the other furnishes 2800 volts to the modulator tube and 2000 volts to the modulated amplifiers. Each filament circuit has its own primary control rheostat and secondary voltmeter. All primary control switches and relays are of the magnetic type, a.c. operated, and are so interlocked that they cannot be operated except in the proper order. In the event that the filament primary circuit should be broken, all high-voltage secondaries are opened by a magnetic primary switch and damage to tubes is prevented. Power leads are run inside the channels which support the panel sections and terminate on a bakelite strip behind a blank panel at the bottom of the rack. All leads to the units are run beneath the floor, and the only leads that show are the antenna feed lines. Bias voltages for all tubes are obtained from dry batteries.

At the bottom of the transmitter unit, just above the blank panel which covers the terminal board, is the modulator unit. One UV-849 is used as a modulator. This tube is mounted behind a cut-out in the center of the panel. Above this the crystal, buffer and power amplifier stages are



mounted. A 210 is used as a crystal oscillator, a UV-211 as a buffer, and two 852's in the modulated amplifier. Each stage is built as a unit and may be removed by disconnecting the power supply leads and lifting it out from the front. All apparatus is mounted on a steel sub base which is spot-welded to a steel front-panel and extends back 12 inches. Standard 19-inch relay racks support the panels and are firmly bolted to the floor. The whole is finished in a crystal black lacquer finish. Just above the transmitter unit is the antenna tuning panel, the feeders going out through the wall at the right.

The antenna is a Zepp 132 feet long and 55 feet high. The mast which supports one end of the antenna is of wooden construction and is well supported by guy wires which are broken each few feet by insulators. Turnbuckles are provided so that the tension on these guy wires can be adjusted.

The receiver is a National A.C. SW-5, and all signals are copied on the loudspeaker. To the right of the receiver on the operating desk is the speech amplifier, completely self-contained except for the microphone battery. Three stages are used, with a pair of 245's in push-pull feeding the 500-ohm line to the modulator grid. A Kellogg



microphone is used for voice pickup. The audio system has been very carefully shielded, and excellent quality reports justify the trouble and expense of such precautions. To the left of the receiver is a dynatron frequency meter, using a 235 tube operated with a.c. on the filament and self-contained B batteries on the plate and screen. Separate switches are provided for the filament and B supply so that the filament may be allowed to reach proper temperature without the drain on the batteries.

All controls on the power supply rack are contained in duplicate on a remote-control board in the top of the right-hand desk drawer. Push-button control is used to open and close all power circuits. A relay, interlocked with the power-supply relays, disconnects the speaker from the receiver and grounds the receiving antenna when the plate power circuit to the crystal oscillator is closed. These interlocking relays are so arranged that duplicate controls can be provided for

remote control from points other than the present control desk.

The shack consists of two rooms built at the side of the garage, each 18 by 9 feet. One is used as the station and the other, not shown, contains the workshop where all experimental work is done.

Although W5ANW has been on the air for only a short time, all districts have been worked with R8-9 reports. Several weeks ago W5ANW acted as key station in an all-district QSO. W5ANW is an ORS, but so far very little traffic has been handled. An appointment as Official Observer for the So. Texas Section of the West Gulf Division has kept the receiver and frequency meter quite busy for the past few months.

This station has been designed with the ideal amateur radiotelephone station in mind, and, while no ham is ever satisfied, Carter feels that few changes could be made to improve convenience and certainty of operation.

WISL, Boston, Mass.

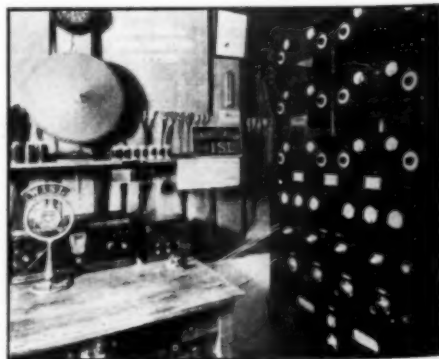


COLONEL D. S. BOYDEN has been active in amateur radio since the early part of 1922, and has held the call WISL from that date to the present time. The years between 1924 and 1930 were spent in experimenting with many different tubes and circuits, varying between the extremes of the good old 202 as a self-excited oscillator and an 852 as the output tube in a crystal-controlled transmitter. By 1930 Colonel Boyden had a pretty good idea of what the ideal amateur station should be, and work was started on the present layout. Since the station is located in an apartment house, the power had to be low; because 'phone operation was contemplated crystal control was incorporated; and because operation on the three major amateur bands was desired the equipment should be very flexible.

The power plant occupies the lower half of the transmitter frame shown in the photograph. In addition to separate filament transformers for transmitting and audio tubes, there are two high-voltage supplies which can be adjusted to give anything between zero and 1100 volts. The five

Radiostats for adjusting these two units and the filament supplies are mounted on the front of the power panel. Directly above these are four three-point switches which contribute largely to ease of operation. Above the power supplies are three complete transmitters; the lower one operates in the 3500-ke. band, the middle one in the 7000-ke. band, and the set on top in the 14,000-ke. band. These three transmitters are nearly identical in construction, with two 210 tubes in push-pull as the final amplifier in all transmitters. Type '10 tubes are also used as crystal oscillators, as well as buffer amplifiers. Since all crystals are ground to frequencies between 3500 and 4000 kc., doublers become necessary for the higher frequencies, and 841's are used for this purpose. By means of the four switches previously mentioned the power supplies can be connected to any one of the three transmitters. This feature is very convenient inasmuch as it is often desired to

(Continued on page 90)



Results—International Contest

(Continued from page 28)

169 185* 224 227 966 EI 8B* F8 ARV HF NP OD SP SX
FM4 AB FM8 CR* EG GK* G2 BM CX IG OC PD G5 BG
BV* GD RO SY WG VY ZV G6 QB VP G15 MO QX HB
9N LA 2W OA FE R VE 1DQ VK 2XU V08 AN MC*
V03 WN WI AE* AK BDI BHM BSK BZ* CLZ MK* MV*
VC ZJ W2 AIP ARB W3 CCF* CM DC W4 MR W8 BLG
BLP CSM SY W9 GV YI GKR ZS 2F 6V IN PORTUGAL:
4 MBA G5 EV HJ LI OM VL G6 LM NK RG K4 RJ OK
JVA PY IFF VE 1BT 2AA VO 8MC V57 AG AP GT* W1
AE BFO BHM BZB DBY DCH HG LZ PH TW WE WV*
W2 ACF AZO* BCX BHM BBO BSR CVJ LZ VO W3
BUX CCF CM W4 AXW AWO BC W5 BM KC W6 AMO
BAX CV DER FCL YG W8 AFP CCW CXP DML PFG RV
W9 ADN* IJ X 1AA Y16 KR* WG ZL 3BN IN ROMANIA:
G6 FY ML RG IN SPAIN: FM4 AB HC IFG K4 RJ RW LU
9DT PYI IFF PY2 AJ SP 1CO 3AR VE 1BY 1DQ* 2CD
4XK VP 2MO VS 7GT W1 AE* APU ASL AVJ* AVV* BDI
BHM* BSK CDJ DYC* DCW HG LH LZ* MK MX PH*
RR VC ZJ* W2 ACC AD ADP AGX* AIS AJJ AKU BBT
BPU BSR* CIJ CZE DKU OX WC W3 BKA BLO CCF*
CM DC FQ* VF ZW W4 APV AWO BC DW MR W8 AU
BLP CJF CRA* CSS CTE* DOD DWV GZ SU* W9 IJ LF

LOGGED IN NORTH AMERICA

IN COSTA RICA: G6 MN IN CUBA: EAR 96 HJ IAK W
2ARB 3EO 7AJO 8ANT 8BWJ 9HJU IN MEXICO: F3
JTB LU TMS OA4 J* V PY IFF

LOGGED IN OCEANIA

IN AUSTRALIA: CT 1AA* G 5ML 6QB 6VP J 1CT* SCE*
OM 2RC OK IOG PK 3BO VP IFF VS 3A GAE* 6AH VU
2DE* 6VAU YH 1RV IN NEW ZEALAND: J 1CT IN THE
PHILIPPINES: CT1 AA AE J1 CT EI PX J2 CB VS6 AE AH

LOGGED IN SOUTH AMERICA

IN ARGENTINA: CE 1AI J 5AK OA 4J PY IFF 2AJ 9HC
VE 3BM WI ABZ AE Z2* W2 AZO BFD BSR FF VO W3
CEP PE V5 ZW W6 ADK AHP AWY BAM* BHA BJA*
BNC BVX* CKR CTP CUB* CVV DAK* DIO DJJ ELC
EXQ PB QW RP SO* WB W7 AIT WS AFM DOD DWV
PA PE W9 ADG BM DKU ECU GDH GV* LF* X 1AA 9A
IN BRAZIL: CN 8MI CT1 AA* AE AN CX2 BM BT EAR
96* 224 EI 8B G 5BY J 5CC K5 AA* AB K6 CRW LUI AJ
8Z CADY LU 3FA 4DA 7AS 7EF 8DJC 9AX OA4 J U OM
1TB ON 4JB VE 2CC 3BM VS 6AE W1 AE* ASP DBO* LZ
MK* PE SW TW VZ ZZ* W2 AKK BPD BSR FF IN JC KC
W3 ANH CCF W4 AGR* AKH BG VV VS 5AC AD AUJ*
CAW Z4 W6 AHP* AKD AVB BAM BJA* BTY BVX BZ
CAL CTP CXX* CYV* DJI EHP EOB EOV FAL PD RP
SO VO W8 W7 W9 ACB AEP AIP* AUP TD W8 AFM BNF
CCW CKR PE SG SY W9 AJP AZM DKU DMA DRD
EF EGD FFM GDH GFZ* GKO GV LF MV YU ZD ZL X
1AA* YM IZZ ZL 2BG 2CI 4AP ZS 5U* 6W 6V* IN PERU:
FJ MTA K5 AA AK V2 NR XU ZW V4 GK W1 MK W4
BC W3 AUJ CAW W6 AHP AVB BAM BJA BVX BZ CTP
CUH DIO DJI EA* EAL SO YAU W7 AF W8 CXR DV
SG ZY W9 ADG ADN BPL DFH EGG GDH GKJ GV LF
X 1AA AX

Second Period — March 10th—16th

3500-ke. band

LOGGED IN AFRICA

IN SOUTH AFRICA: W1 ALJ AZK W3 BEL W5 VO W6 BP
CJO COJ DYJ YAU W8 BAS BFN EFO HD W9 BUB HVA

LOGGED IN EUROPE

IN FRANCE: W1 MX IN GERMANY: G 5JU HAF SG OZ
IW VE IAX WI CRV UH YU* W3 NF* IN GREAT BRIT-
AIN: W1 AUC BHB MW W2 AOA CFV DPF UL W3 AAJ
ABA APV EJ NF IN NETHERLANDS: W1 MX IN SWIT-
ZERLAND: W1 YU

LOGGED IN OCEANIA

IN AUSTRALIA: W1 ADW W2 ACM AVL CFV W3 AAJ
AIP W6 AEP BXC DER DSN EGJ YAU W7 AWI W8 FTT
W9 FRH VD IN NEW ZEALAND: K6 BAZ W1 BP BPA CAV
W2 AUL CFV CVB DJY W3 AIP BBD W4 EI W5 ASU AZV
W6 AFB AEP BVZ CA CJO DZN EGJ W7 AFB AEM DP
W8 AFO FQA W9 ABS BN BFN FRI

LOGGED IN SOUTH AMERICA

IN CHILE: W1 MX W3 AHA AMN OK W4 FI IS W6 BP
IGD PQ W7 EN W8 BFN CAV W9 BN

7000-ke. band

LOGGED IN AFRICA

IN ALGERIA: VK SHG W4 AG X 1AA IN MOROCCO: CT1
IAV CB GU XZV 5BI EAR 37 F8 AT AX NW NY PK SA
SVK VL G 2AX SLA ONA MOK ONA OGH SP8 AR EH
IYES AA GU W1 CDN DL MK W2 ALP AV BCE CUQ W3
RUF LA UT W4 ABT AJK IN SOUTH AFRICA: G5 BY ML

GI 5ZY J1 CT DH* DM K4 RK* K6 COZ KA 1NA* PK1 CF
PK3 BQ PR* PK4 AU DA DG VK 6GF VU2 CH JP KH W1
BDI DCL LZ ME MK MX W2 AFR ALP AX AVN BCB BG*
BST* CPA CVJ DM UK W3 ADJ BBB BCB CCF CGF WZ
W4 ABT* AG DW* EH EIL MK* PCV SI W5 ACD ADP
AOY AXV AVL AZV BBI BSE BZW IT RV UX VJ W6 AEF
AHP AKD AM* AMO AOR AXN BC* BNC BRF BSJ BXL
BY BZK CCX CIB CKW COO CVZ CXW* DCV DEP DTN
EGH* EPL ERT ETL SN SO YO YU W8 ALT BNY CAU*
DV EER* EMM ER FAQ ZN* W9 BNT* CNO* HGM HUF
QT*

LOGGED IN ASIA

IN CHINA: J1 CP CT DH DS DV J2 CB CE J3 CE CG J5 AZ
CE J 6CJ 7CF K5 GR KAI DP HR LG NA PR RT KA 3AA*
OM 1TB PK4 AU* CH VK2 BQ HR LG NA PR RT KA SW
VP WB WZ ZX* VK4 EB VK5 AW ML MY PH PK VK6 LK
LJ OW VS6 AD AE* AH AN AO AP W6 AHZ AM* BC* BO
BZE CBO CIO CX* CXW DMK ECW EGH EPH HM HO
SG SO TN VB VO* IN JAPAN: AC8 AC LS AC9 GH AUI CC
KAU KAI CH DP HR JR NA ZC OM 1TB 2DM PK 3GW
3IJ 4AU VK2 AX BO BR BV FO GR HG OC VC XG XU WZ
VK3 CX DC ES HL JF KA LF LO LM PP PR TM VP WY
WZ ZB ZX VK4 AS BB DG VK5 GR CK RH YH VK6 FL GF
LJ VP 1BO W03 FM VU 2PN W5 CT UX WA AM AH* AHP
AHZ BC* BZ BL* BY BZ BZ CBO CXW* DCE DGV
DLI DOU EDO EGH* EI ETL EV EXQ EVC FCL RO SO
VB VQ* YO YU W7 BB BOE KK

LOGGED IN EUROPE

IN AUSTRIA: AU 7DE CM 2FN CT1 AA AH CC CP GU
CV5 AE BD BI BS SG X 1D4 ADE ADC BRR RER EAR 46 74
96* 227 FO MF MM VU ZX EI 2BK BB ES SX EU2 KBF
KDF ET EU 5DM CSKW XZICH FB AL AT ATZ BED BL
CWL DS GE GRG JFM NP SD TX VK WM FMA AB* FM5
IB FM8 AV CA CR DA EG EV IH IG QZ PP ZO G5 BY OJ G
TY HAF3 RL VL HB 9PF I 1FC J 1CT* LA2 Q R OH2 DSA
YA ON4 CN GQ MOK OZ2 RD IR OZ7 FK PAO GH IM FO
SPR PK 3AU RY IA ZK SM GRS SPI AF A BC* CP SP2
AB SP3 AR DC DO EI HA IT OM 1287 SU 1EC* VE 2BE
VK3 LZ ZX VK SHG 7CH W2 CVJ* DEB UK* W5 BFM BMU
CCF MD W4 AEH BCQ MK W9 EDU FS FKN X 1AX Y1
6WR YM 420 ZG 6IN ZD 2AM ZL1 RZ ZL2 AJ CU RN ZL3
AG AI AVN IN FRANCE: CM 2NM CT1 AH AS BJ CO
CT2 AX CV SPB D4 RDW SLV UAO EAR 96 EU 2KT FMS
FS GT* JO* G1 AI CW GS KO G 5KO 6VY G1 6YW HAF
9AF I 1RAW OK 2VA ON 4SL PAO GH IM SPI BO SP2 AB
SP3 DK EI IT SU 1EC VK2 BR OC* VK3 HX LO MR VP*
ZX* VK 7GE W1 BDI W2 BG NZ W3 CCF CCH W4 FT W5
AZV ZL 2CI 3A* 4AO IN GERMANY: AU7 DE* KAO
CM2 FN GR MM* WD CM8 YB* CN 8MJ** CT1 AV DJ
CT2 AN AP AX* CT3 AD CV 5BI EAR 149 164* 221 224 228
233 E15 K NT E18 B* C* D* EU2 GF KT* F8 PAD RP SF TX
FM4 AB RIP FMS AV CR* D DA EG FS* GK GT* IH JO*
MJ CT2 BM G5 BJ BV** DL JU LO PH UC G6 DM PA VV
YL G15 OX* ZV* HAF 2C HAF3 C* SW HAF5 C G HAF6 A
HB 9V HCL AP EG YR HH 7C* HK 1DA I 1IM* J 1CT KA
ACR* RK* K5 AC* LA2 G O OH 2O OK2 LO MA ONA DJ
MOK* OZ 2N 7LB PA OGH RY 4LB* SM 6UA SPI CP SP2
AB FI SP3 AG AR KC MK OM SU AI QH EC** UN 3ES
7P* UO 6RS VK 2OC* VP 2PA VS 6GB VU 2KH W1 BDI**
BN BO BTE CH DS IF ME MK* MX* QB SI W3 2S AIS
ATKAVN BG* BI BOD CAZCMO* COK NX* W3 ANH BUY
CN** MD** W4 ABT* A1K AJX AZX EG FT MK**
NN QI TY UX W8 AON CAU YI GWR YM 420 ZG 6JM
ZL1 AR ZL2 CI FT GN JE* RI ZL3 AI AW BN CC ZU SA
IN GREAT BRITAIN: CE 7AA CN 8MJ* FM8 CG CP CR*
EG* FS GT* IH* JO HG IFG HH 7C* J 1CT KA AC* KA
1JR LU 1ZA* PY IFF SU CH EC VK2 JC OC* PZ ZN VK3
HJ ES* GO HL JF KX LO TM TX* VP* WL* WU ZZX*
VK4 AS VK5 BY VK 6JK 7CH* VP2 CC PA VU 2AHW 1
AJM BDI** BNP* BO BOC CDN CNE CRS CSC ME* MK
MX PH W2 AIS* AVN* BC* BO* BSR* BWP* CIM CJI
CNK CNV COF CUA DWQ FS NZ OK OV* UK ZC W3
AGV ANH* ARK BBB* BWA CCF* CDF CFP MD W4
ABT ALX AZB BEO EC* EG* EI* JC* MK NN PW QP WE
ZY W8 AKU CAU* CAW CSS DLV W9 BOF* X1 AA Y1
2DC* 6KR ZL1 BN ZL2 AB BX CI* ZL3 AQ* AW CA CC*
ZL4 AI AO IN HUNGARY: AU 7KAH CE 7AA CM2 FN*
JM WD CM5 FC RV CN 8MJ* FM4 MBA FM5 IC FM8 AY
CP CR* DA* EG EV IH* JO* VK HK 1DA* K4 ACF RK RY
K5 AA AC LU 2LA CT PK4 AU DA PY 2BN SU 1EC* VK2 OC
VK3 GO IF LO LZ TX VP* WL* WX ZX* VK SHG* 7CH*
W1 ABN BCN BDI BNI BZK CA CE CCD CDN CUQ ME PH
SB W2 AC AEW AKJ AN ANG AON AUP AV AX* BFH BJ
BVX BWD BXJ CDP CPG CKA CMO* COE CXP FA LE LI
W3 AFR AFS ANH* BGT BIA CCF* CGU CHU ECF GW
JX MD NT PN VL W4 ABS AEL AGP AGR* AGT AJP APS
AVE AZB BAT BDG BR EG* EI JC MK* PDD TY UK WE
W5 KC VJ W6 AM W8 AON BY CAU CJI CNI CNM DST
ZZH W9 CUL NK X 1AA ZG 6JM ZL1 AA AR BN* ZL2 BX
CI D* FT JE* ZL3 AW CC* ZL4 DB IN IRISH FREE
STATE: CN 8MJ FMS FS GT IH TO HH 7C HI SX SU 1EC
VK3 LO VP XI ZX VP 2CC W1 BDI ME 2V AB VST UK W3
CCF W4 AGP AJX FT ZD 2AM ZL 2CI IN ITALY: HK
IDA KA RK NY 1AA X1 AA D W2 AY BST W3 CDX W4
AZX MK IN JUGOSLAVIA: W 4MK IN NETHERLANDS:
AU 7KAO CN 8MJ* CT1 AV BX CT7 GU CV5 BI EV DM ADC
RRG EAR 18 96 224 226 228 CAJ VP EI 3C 8B EU 5ESS F8
HB IFM NP TX YL FMS AY CP CR* EG GT* IH* G2 AV
US G5 BJ KL OL OC G6 WY GI SUR HB 9X HC IFG HK
IDA* II ID RAW K4 ACF LA 20 3A 3B LU 1ZA OK 1CB OZ
2RS PY IFF SPI AF BO BT SP3 AR DO KZ MK ON SU 1EC
IN 7ET UO 3PX VK2 OC ZN VK3 LO TX VP ZX VK3 HG
W1 MK* W2 ALP AB BDK BO W3 CCF* CDX DA MD W4
ABT* A1K AJX* ALD* EG MK* W8 CAU* CAW EVI W9
LFJ YL 2BI ZL2 BX CI* ZL3 AJ AQ AW CC ZL4 BA DB IN
(Continued on page 52)

• I. A. R. U. NEWS •

Devoted to the interests and activities of the INTERNATIONAL AMATEUR RADIO UNION

President: H. P. MAXIM

Vice-President: C. H. STEWART

Secretary: K. B. WARREN

Headquarters Society:

THE AMERICAN RADIO RELAY LEAGUE, West Hartford, Conn.

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Asociacion E. A. R.
Associazione Radiotecnica Italiana
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Deutscher Amateur Sende-und-Empfangs
Dienst
Experimenterende Danske Radioamatører
Lwowski Klub Krotkofalowcow

Nederlandsche Vereeniging voor In-
ternationaal Radioamateurisme
New Zealand Association of Radio
Transmitters
Norsk Radio Relæ Liga
Radio Society of Great Britain
Rede dos Emisaores Portugueses
Reseau Belge

Reseau Emetteurs Français
South African Radio Relay League
Suomen Radioamatööriliitto r.y.
Sveriges Sandareamatörer
Union Schwed. Kurzwellen Amateur
Wireless Institute of Australia
Wireless Society of Ireland

Conducted by Clinton B. DeSoto

THE national amateur societies of two new countries, Mexico and the Dutch East Indies, have been proposed for membership in the I.A.R.U. as one of the proposals contained in Calendar No. 8 to the member-societies. The Liga Mexicana de Radio Experimentadores (L.M.R.E.) and the Nederlandsche-Indische Vereeniging Voor Internationaal Radioamateurisme (N.I.V.I.R.A.) are both the logical amateur representatives of their respective countries, it was developed through investigation by I.A.R.U. headquarters, and in compliance with the constitution are non-commercial in character, devoted to the interests of two-way amateur communication and experimentation, and the influence of each substantially covers the country in which it is located.

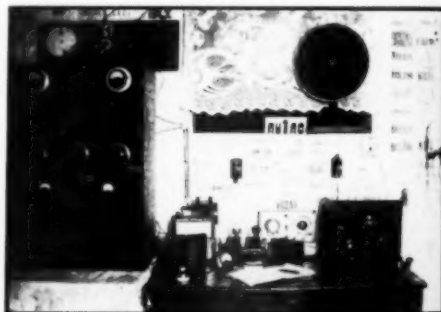
It is hoped that action of Union members on these new applications will be both prompt and favorable. In the meantime, information regarding the activities and achievements of both societies will be welcomed for these pages.

Amateur societies in countries not now represented in the Union are requested to communicate with I.A.R.U. headquarters, 38 LaSalle Road, West Hartford, Conn., U.S.A., regarding the possibility of their securing admission as members of the Union. Not only will the Union be strengthened by the acquisition of strong new national members, but the fraternity of interest engendered among member-societies will be found of great value to any national amateur organization.

On September 15th a new ruling regarding membership in the WAC club goes into effect.

Under the terms of the recent proposal adopted by a vote of 13 to 1 (A.R.R.L. opposed) of Union members, after this date the WAC certificate will be issued only under the following conditions:

1. Where applicant resides in a country which is represented in the International Amateur Radio



AUIAO, VICTOR SOLOMIN, 57 SENNAJA, BJSK, SIBERIA, U.S.S.R.

The transmitter is TPTG with 21 watts input; the receiver has the usual single r.f. stage, detector and two audio. AUIAO will be glad to exchange photographs of his station for those of amateurs everywhere.

Union by a member-society thereof, it shall be necessary for him to hold membership in such member-society in order to be eligible for the award.

2. Where applicant resides in a country not represented in the Union by a member-society thereof, it shall not be necessary to hold membership in any member-society in order to be eligible for the award. (Proposal No. 8, Calendar No. 7).

After September 15th, then, no applications for WAC Club membership from amateurs in

those countries represented by I.A.R.U. member-societies will be honored unless they come in the form of the customary statement from the headquarters of their national society, certifying both as to WAC qualifications and to society membership. All WAC applications in these countries should go direct to the national headquarters, and not to I.A.R.U. headquarters.

Amateurs in countries not represented in the Union will make application direct to Union headquarters as heretofore, supplying the needed proofs in full when making the application. In the United States and possessions and Canada application can be made either to I.A.R.U. or A.R.R.L. headquarters, the community address making correct disposition certain.

The number of WAC certificates being granted this year is keeping right in step with the number last year. The half-year mark passed July 1st showed that 69 certificates had been issued during the six-month period; a year ago on the same date the number was 68. As we observed in the July, 1932 issue, the number of WAC's seem to keep surprisingly in pace with the total number of amateurs throughout the world.

Wrong again! In the June issue we reported that from information received it appeared that the Australian QSL Bureau address had been changed from its February listing. Comes now a message from Bruce Hardie, Federal Secretary of W.I.A., reporting that the change was erroneous, and that the address remains as before: W.I.A., Kelvin Hall, Collins Place, Melbourne, Victoria.

The U.S.K.A. has shifted the Swiss QSL service from Berne to Zurich, the present address being U.S.K.A. QSL Bureau, Postfach, Zurich 22, Switzerland.

Not only the QSL service but the official headquarters address and the publication office of "Radio REF" have been transferred by the R.E.F. The new address is: R.E.F., 17, Rue Mayet, Paris (6^e). The former address at 19, Rue Claude Vellefaux, is no longer to be used under any circumstances.

A similarly all-embracing change has been made in the headquarters location of the N.Z.A. R.T. All communications, QSL cards, etc. for New Zealand should now be addressed to P. O. Box 617, Christchurch, and to that address only.

The receiving portion of the B.E.R.U. contest was well supported by Zone 1 members, reports J. Clarricoats, Hon. Secretary of the R.S.G.B., although only a few B.E.R. Stations were entered. This was probably due to the fact that a great majority of the B.E.R.U. members are already licensed transmitters.

A. T. Mathews, BRS497, of London, was adjudged winner in Zone 1, while G. W. Horton (BERS74) and D. E. White (BERS112) won the awards for Zones 7 and 12 respectively.

The Catalanian Gang, regional group of the Asocia-cion EAR in Spain, recently elected a committee to comprise its regional delegation for representation in the affairs of the national society. It is comprised of Alfonso Lagoma, EAR29, Luis de la Tapia, EAR117, and Alberto Roca, EAR222.

One of the first official acts of this committee was the offering of a special prize to all foreign amateurs, consisting of a cup to be awarded the

owner of the amateur station sending the most QSL cards intended for Catalanian amateurs through the QSL Bureau of the Association EAR. The winner of this prize will be determined at the end of 1932, and the cup sent during the first fortnight in January, 1933.

A special exhibition of amateur apparatus, including an ultra short wave transmitter and receiver, was prepared by the D.A.S.D. for their stand at the National Radio Exhibition scheduled to be opened in London on August 19th.

Japanese amateurs found DX conditions during the past spring and summer rather poorer than during the 1931 season, we are told by K. Kasahara, J1EZ. W6, W7, and K7 come in very well on 7 mc., as well as on 14 mc., while a few eastern U.S. and some Central American and European stations can be heard on this band. The signal strength is poor, however, and QSO's are few.

The J's have been very interested in the operation of W6USA in Olympic Village, California, and regret exceedingly that the strict regulations existing in their country prohibit handling of the message traffic from this station. Japanese amateurs are limited not only in transmitting power input, but are restricted to special QSO hours as well. These hours are as follows:



THE SMILING PERSONALITY BEHIND THE SIGNAL FROM VK3ML

R. H. Cunningham, 1 Dalny St., Malvern, Victoria, Australia. Tony's there, too, even if a bit in the shade!

0100-0300 G.C.T.
0500-0600 "
0700-0900 "
1300-1500 "
1700-1900 "
2100-2300 "

DX men, please note.

The amateur licensing situation in Jamaica, British West Indies, has so far improved during the past year through the efforts of C. L. Isaacs, VP2PA, that the government is now granting amateur station and operator's licenses in accordance with regulations much the same as those existing in the United States. The principal variation lies in the requirement for fees in accordance with the English custom.

These fees run as follows: 5/ for certificate of proficiency as an operator; 10/ for transmitting license; and 10/ for receiving license, making a total of £15.0 for the first year, the renewal being £1 per annum.

Brief items of gossip from the month's mail: It seems that Professor Piccard's wife made strenuous objection to the famous Belgian physicist's intention of making a second ascent into the stratosphere (see August QST, this department) and compelled him to agree to let Max Cosyns make the attempt alone . . . Cosyns was unable to qualify for the necessary aeronautical license, however, so the pair had to override the Professor's wife's determination



BELGIAN AMATEURS ON A TRIP TO DINANT sur MEUSE

Left to right: YL, ON4FM, ON4AU, ON4HB, ON4WC, and ON4OR, district manager of Brabant. On the motorcycle: ON4BZ, district manager of Namur, and ON4EU, of Liege.

... Says Dr. S. H. Walters, ZU1D: "I suppose KBW has been struggling with Spanish and learning the tango in preparation for his Madrid trip!" . . . Nay, not so. There's no mixing the amateur fight and the tango, that's apparent . . . U.S. stations received in Ireland on 'phone by Mathew Sheridan, Leggh, Wilkinstown, Navan, Co. Meath: W2CIF,

W1BAC, W3ALV, W2AZ, W1DTJ, VE1AX, W1ID, W2CMH, W2DOK and W3BMS . . .

Here is an amazing thing. If you hear strange calls such as LOA (accented A), CEM9, B10, don't jump to the conclusion that it is some pirate at work . . . The British Navy is ill-named the "Silent Service," says a correspondent, and as part of their secrecy program they start up their 2 kw. sets right in the middle of the amateur bands (where there are more listeners per kilocycle than in any other part of the spectrum) with rough a.e., using fictitious call signs . . . Our informant is a Britisher, too, oddly enough . . . A. S. Mather, VK2JZ, is engaged to be married, confides VK2FX.

Results—International Contest

(Continued from page 49)

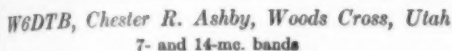
POLAND: AU 7DE CN 8MJ* D 4MOW EAR O 128 149 BE 4DI PS GRG XL FM 8GK G 5BY PAO GH XEX TF 4848 1EC W 4FT ZL 1BN 2BX 2FI 3BN IN PORTUGAL: CN 8MJ VK 3VP 5HG W1 AFB AJM BSD BZZ W2 DIA W1 BEQ W8 EGV IN RUSSIA: SV 2DR W 1ME IN SPAIN: CM2 JM* MG OP* CN 8MJ* CT 2AN* EI 1T 8B FM FP JO* IH* G2 BM PD G6 YC G1 52 K4 AAN ACF PH* RX K3 AC* LU 1A* PAO GH PS PK 4AU* RX 1AA* SP 1L CP UO 3JS VK 3ZX* 5HG VP 2CC* W1 AF AFB AFU* AJM AL ASP* BDI** BNP BO BPH* BWJ* BWO BXC* BOC CBZ* CJD* CPZ CSC* DCI* KC KP* LZ* ME* MK MX* PH* QS* SI WU* YU W2 AAS AE AEW* AEX* AF* ARZ AIS AKW ALI* AMR* ASS AX* AYN* BAL* BRP* BSB* BST* BWP BXA* CAZ CBO CGT CHB CIJ CIM CLC* CMO COK* CPA* CPG CVJ* DNQ* DRJ* FS* HG* ND UC* UK* VL WC* ZA* ZC ZG ZZA* ZZZ* W3 AAY* ADG* AHJ* AHN AHV AX BAN BPH BGL* BHS* BIM* BMM* BFW* BRO* BUX BUY* CCF** CCL* CDK* CDX* CFP CGN* CXL* DO* GD* LA* MD* PC* PN QT* W4 ABT* ABZ* AEA* AFE* AGP* AGR* AJK* ALD* AMP* AZV* BBX* BEQ* EG* EI* FT KB* MK* PBX* PDE* RE* TC* VA* VP* VL WJ ZH W5 ACB* AUN* BBC* BEB* BMT* BSE* CT* UT* RG* VJ* W6 BC* WE ALI AKJ AKI ANT* AON* AXH* BGT* BI* BID* BIZ* BNY* BOS CAU* CIF* CKX CLD* CU* CXC* DFH* DGP* DL* DWV* EGY* EUC EX* FEC* IL* KH* KV* ZN* W9 AEH ANB* AOV* ARL* BOF* DKU EFC* EGE* EKY EOC* ERH GCH* GVS HWF* IJ NK OX* QT* XI AA* AX* N X 9A* ZLI BY* ZLZ FI* JE* ZL3 AO* AS* AZ BC* CO IN SWITZERLAND: W1 BNP BTE W3 BLQ CCF JM W4 ABT W9 AOE

LOGGED IN NORTH AMERICA

IN CUBA: EAR 96 224 227 VE 2CQ 3BM VK 3HC 4WT 5JO 5WR W1 AUK W2 ALS BML CWC NN W3 AHJ BEJ BVN W6 BZE DGC W8 EWI W9 EYX FIC X ZL 2GR IN MEXICO: CE 1AI HK 1DA JI CT DH DM* DV ER J7C K5 AA K6 AJA ARB* CQC COZ* KAI CM NA PK 4AU VKI AJ CR JE LJ OC* RA VK3 ES* HF HL* HR JE JK MX TM* VP* ZB ZX* VK4 AH WT VK5 HG PK* ZLI CP ZLZ BX CI ZL3 AQ BC CC IN NEWFOUNDLAND: CN 8MD BAR AF FB CS GJ PZ SD XZ FMH CR G2 BM OF G5 ML G6 HF HB9 AA AA HI 8BX K4 RJ K5 AC VK 6WI X 1AA ZL2 CM JE ZL4 AO

LOGGED IN OCEANIA

IN AUSTRALIA: AC3 AA GB MA* AC8 AG** WE* AC9 GE GH CN 8MJ* CTI AA*** AV* BX BY DJ* DX** CU CE AX EAR 7 95 96 161 169* 185 224 227 228* ES 3RP FI AE AX* CM SD SX TX VK FMH EV IH*** G2 BJ CW G5 BV* FM VL G6 BA GI ZSY HAF 9AF* HB9 A Q HC IFG HH 7C HK 1DA JI CT*** DH* DM*** DV** EE* EK** EP* EG* ER* FD FM J2 CB CG J3 CL CO CR* CS CT DL* DO SH VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 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K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY 8SH PAO CM FP GH** IM OQ SP1 BQ BI DT TI 3FI UO 3JS VE 3BM* 4GM SEH SFH VFI AD FR FR VSI GL W1 VS3 AC* VS6 DQ* AE* AY* AZ* BZ* B10 AL ARB AYD BAZ* BOE* COZ* K7 ATD KAI CH* CM CO* HR JR LG NA** KAA HW LA IH 2B OH 4UN 7MF OK 2RM* OM ITB* 2DM* PK1 CF PK3 BQ GW JI PR PAI AU* BQ DA PY



AC9 C5
GU CT1
P F8 AH
G5 BY*
HH K2
DQ DQ
F DU K6
CM CP
PF PK
BQ BT
FF FR
G7 GU
J1 J2
AJ AU
CA CJK
DO AFL
EJ EL
FV FC
AV AVF
JC JC
CA CJK
BZ BZ
P CR L
XW**

3500-ke. band
7000-ke. band

cm1bx cm3ig ve5ltp
cm1by cm1mm cm1pw cm2ef cm2do cm2fc cm2gr cm2ip
cm2jm cm2lc cm2mg cm2op cm2pa cm2rc cm2rs cm2ss
cm2wd cm2ww cm2yb cm2sa cm5ag cm5ea cm5of cm6rc cm6eg
cm7ah cm8lc cm8yx hc1gf hc2js hix8 jlt1 jld1 jle5 jlkc
j3c k4nc k4taop k4tbu k4es k4rj k4rk k4rj k5aa k5ab
k5ac k5ad k5ae k5agi k5at k5au k5au k6aja k6alm k6aua
k6avi k6bas k6bhg k6boc k6cbj k6cdh k6cdh k6dla k6ebr
k6ehr k6fab k6np k6yd k6lir o4u om1tb t31a ve2be
ve2qz ve2gr ve3bm ve3bv ve3cf ve3co ve3dd ve3el ve3kg
ve3gi ve3tr ve3jpu ve3be ve3hd ve3hp ve3ib ve3j ve3jr
ve3lj ve3nn ve3ud ve3yh ve3ab ve3af ve4ci ve4dj ve4dk
ve4ef ve4it ve4hm ve4ib ve4it ve4fe vk2ad vk2av vk2bm
vk2bj vk2br vk2bu vk2bv vk2fq vk2gr vk2jb vk2hm
vk2iq vk2ka vk2jz vk2ys vk2lx vk2ms vk2oc vk2oj vk2tx
vk2wz vk3ca vk3cx vk3gi vk3hk vk3hq vk3ja vk3ka
vk3lb vk3ln vk3ls vk3ml vk3mn vk3oc vk3pb vk3rj vk3rp
vk3tl vk3wl vk3wx vk3ws vk3ag vk4bb vk4gd vk4ju
vk4wd vk5by vk5gf vk5kg vk5j vk5v vk5vk vk5it vk5iv
vk5jm vk5mb vk5mk vk5ml vk5pk vk5rh vk5wb vk5wi

vk5wr vk5xh vk6bo vk6cb vk6cx vk6jk vk6lk vk6mu
vk6ot vk6wi vk2pa xlax xld xlh xlr xls xlu x9a x10a
x26a ynlmic zllar z12ce z12cj z12di z12gd z12gr z12gw
z12hl z12kz z13as z13bj z13bn z13ce z13cx z1als

14,000-ke. band

cclai ccllk ce7aa cmlbb cm2cf cm2jm cm2jt cm2mg
cm2mm cm2op cm2sh cm2vm cm2xa cm5by cm6rc cm6sg
cm8as f8vd g5ml hjlak hnlba k5aa k5ab k5ac k5ad
k5ae lu2ca lu3oa nylaa nylab o4ag o4v o4z py1ff py2ak
py2bn py2bq py7ab rx1aa t2ac t2ig t2ir t2tr v1yb
v1ek v2ap v2aw v2eb v2bb v2ca v2ch v2cl v2er v2ex
v2fd v2bg v3bh v3bk v3bm v3cf v3cj v3fl v3fx
v3ft v3gg v3ga v3he v3hw v3ib v3ic v3ig v3ih
v3im v3jm v3je v3kc v3cl v3rf v3wa v3wm v4bj
v4bq v4ci v4cv v4dk v4ed v4ft v4gr v4gt v4gu
v4gx v4gy v4ha v4he v4hm v4hu v4is v4je v4jb
v4jx v4mg v5bh v5cf v5cp v5eg v5al vplja vplpa
vp2mo vp2pa x1aa x1af x1d x1a x3a x9y y3lo z1lar hclfg
er224 x1ae vk2tu vk1x kbbh klebr f3mta

14,000-cc. 'phone
cm2ra cm2xr ve1dq ve2be ve3bk ve3he ve9al vk2lz xlaa

W6FZQ, Charles E. Spitz, Route 5, Box 278
Phoenix, Ariz.
(week of May 18th)

14-mc. 'phone
ve3hb w1bgr w1btr w2aog w2bro w2rq w2tp w4aor w5abo
w8em w9ld w9brx w9cjj w6aj

14-mc. c.w.

cm2fn cm2mc cm2umm cm2mg cm2rc cm2vn ct1aa ct1bg
ct1cb ct1ia d4hol ear9e ear228 f8ex f8od g2bm g2ip g5la
g5et g5ay hb0u hhte hj2ak jlee jlep j3cn k4aop k5aa k5ad
k5ae k6aag k6cmc k6cra k6bre k6irn k6fer k6tak k7alt
k7ad k7bli k7hh lu2ca lu3de nylaa nylab oa4c oa4d
oa4v oa4s oh5ng om1tb om2tg on4bz on4fe on4gk on4ja
on4ix on4rm on4uu oa4a pa0xf py9am rx1aa t12r t12r
ve1ck ve1cy ve1df ve1dr ve2cl ve2df ve3bm ve3em ve3gt
ve3ga ve3hv ve3if ve3ig ve3im ve3jy ve4ae ve4bi ve4b4 ve4bu
ve4cv ve4ed ve4gr ve4ft ve4fu ve4gr ve4gt ve4ha ve4he
ve4hu ve4j4 ve4ka ve4ox ve5cf ve5cp ve5ff ve5fg ve5fo
vk2aj vk2ba vk2cu vk2ls vk2sp vk2xf vk3bz vk3dt vk3jt
vk3pl vk3mr vk3rj vk4g vk5hg vp2pa x1aa x1ax x1d
x1u x5a x29a x29b x1aa x1lar x1ife x12ab x12bx x13aq x13ce
zn2a zn2a

W5AUX, W. L. Ratisseau, Jr., 3812 Ave. P.,
Galveston, Texas

3500-ke. band

7000-ke. band

cm1by cm1mm cm1pw cm2cf cm2do cm2fc cm2gr cm2ip
cm2jm cm2lc cm2mg cm2op cm2pa cm2rc cm2ra cm2s
cm2w cm2ww cm2xa cm5ag cm5ea cm5of cm6rc cm6ag
cm7ah cm8lc cm8yb hclfg hc2jz hix8 jldt jldo jlee jlkc
kaf klacf k4aop k4bu k4es k4jr k4rk k4ry k5aa k5ac
k6a k5ad k5as k5be k6agi k6ain k6aiu k6aja k6alm k6aqr
k6ar k6ba k6bgh k6boe k6cbj k6cdh k6db k6dvs k6eug
k6eh k6fab k6np k6yd kalr o4u om1b t3la ve2be
ve2fg ve2dr ve3bm ve3bv ve3bf ve3co ve3dd ve3el ve3kg
ve3l ve3gt ve3gu ve3he ve3hd ve3hp ve3id ve3jf ve3jg
ve3lj ve3nn ve3od ve3dyh ve3ab ve3af ve4ci ve4dj ve4dk
ve4d ve4ff ve4hm ve4ib ve4it ve4fe vk2ad vk2av vk2bm
vk2bj vk2br vk2bu vk2bv vk2fz vk2gr vk2hg vk2hm
vk2jz vk2hs vk2jr vk2js vk2lx vk2na vk2oc vk2oj vk2p
vk2w vk3ca vk3cx vk3gi vk3hk vk3hq vk3hs vk3ka
vk3ld vk3ln vk3ls vk3ml vk3mn vk3oc vk3pr vk3jr vk3rp
vk3t vk3wl vk3wx vk3ys vk3ag vk4bb vk4gg vk4ju
vk4wd vk5by vk5fj vk5kg vk5gr vk5hs vk5it vk5iv
vk5jz vk5mb vk5mk vk5ml vk5pk vk5rh vk5wb vk5y

W1COO, Arthur E. Bent, Weston, Mass.

14-mc. band

cm2jm cm2jt cm2lc cm2mg cm2mm cm2ra cm2rs cm2sh
cm2vm cm5ry cm6ag cm8ax cm8mi ct1aa ct2aw d4gge
er185 er224 f8ex f8cx f8m g2bi gebm g2aw g2fn g2m
g2kh g5aw g5bj g5fv g5la g5lv g5oj g5qa g6ax g8bp g8vp
g8wy g9yc g9yx h2cjm k4ph k5aa k5ac k5ad k5ae k5a2
lu2ea ny2ab os4u ok2ma ok2m ok4n ok4s ok4j on4or on4o
pa0ll pa0fx py2bk py2bn t3ftp ti2ags ti2db ti2fg ti2rc
ti2tao v1yb ve3ay ve4bq ve4ci ve4fx ve4is ve5lc vo8wg
vp1ja w5ace w5ana w5aej w5ai w5ab w5abw w5anu w5auj
w5awu w5asv w5bee w5bnw w5boc w5bot w5baw w5bak
w5bzy w5chy w5ccb w5gw w5hi w5ie w5kc w5rb w5r
w5sh w5t6 w5w w6adx w6ahu w6bax w6bba w6be w6bbp
w6bif w6bwi w6bze w6cal w6cbp w6cdo w6clh w6crl
w6ctm w6cul w6cwe w6dgu w6dix w6dkl w6dml w6dop
w6dre w6dtt w6ebo w6egh w6eqb w6erm w6eug w6eup
w6eiy w6ebk w6ell w6tj w6vb w6yu w6ah w7bce w7bd
w7bfq w7bw x1aie

THE COMMUNICATIONS DEPARTMENT



F. E. Handy, Communications Manager
E. L. Battey, Assistant Communications Manager

PRIZE ARTICLE

The following contribution by Mr. W. D. Hall, W8TI, wins the C. D. article contest prize for this month. We feel sure that the two additional contributions on good operating and traffic work by Mr. Googins, W1CEQ, and Mr. Marks, VE3CP, will likewise be appreciated. These both receive honorable mention in connection with our contest. Your article will also be welcomed for contest consideration. See full details concerning our Article Contest elsewhere in these columns, and send us your contribution.

More About This Off-Frequency Work?

By W. D. Hall*

AT W8TI a special investigation was made of off-frequency work through the facilities of the A.R.R.L. official observing system. One hundred off-frequency stations were sent the regular O.O. forms which ask station owners to account for deviations giving data on their equipment. Thirty-four replies were received and analyzed.

Eight claimed radiation of a harmonic. Five claimed they were not on at the time heard. Only three showed in their letters they did not appreciate the notification. But one operator replying had a frequency meter, and but nine a monitor. From the log it was found 51 had poor notes. Thirty-five were heard more than 50 kc. from the nearest band. Eleven were QSO other stations when heard. One had a crystal, 20 were not listed in the call book four months old showing a majority of newcomers. Two were above 4000 kc., 4 below 3500 kc., 59 above 7300, 34 below 7000, 1 off each side of the 14-mc. band. One station got off two bands in the 10 days' period (accounting for 101 off).

Common faults given as reasons for the off-frequency work were: change in transmitter frequency during operation, failure to check frequency before going on, no apparatus for checking frequency, and failure to know that a transmitter emitted harmonics. The majority agreed to take action at once to make stations comply with the regulations.

If a station is heard off-frequency and has no apparatus, the operator should be man enough to admit it—most fellows do, anyway. No amateur license was suspended from a single report from one official observer. Observer's work is a friendly and thus volunteer service carried out to SAVE licenses for amateurs. If the A.R.R.L. did not provide its system, the Federal Radio Commission would have its own, and sterner measures, following more widespread observations than now made through the monitoring stations

* A.R.R.L. Official Observer and W8TI's 2nd opr., 129 S. Walnut St., Morgantown, W. Va.

operated by the government in each inspection district. Which would you prefer to be heard by, the F.R.C. observers or the A.R.R.L.? If amateurs do not follow the suggestions of the A.R.R.L. Observers, the League will discontinue such postage expenditures and the RI will take increased action (using letters which require no postage) asking for tickets. This would cost Uncle Sam additional effort, with the possibility of an amateur tax later on, to cover such expenditures.

If you can measure frequency (on 7 mc.) to better than 50 kc., start in and QSO stations further from the band than that and tell 'em to QSY. When your CQ brings in a station with a wobbly note, ask the operator to fix it up.

If you can't measure to 50 kc., and work on the DX bands (7 or 14 mc.), you better remind the mailman of your call so there won't be any delay in receiving O.O. cards. Refer to QST for times of the Standard Frequency Transmission, and start in. Now that you can measure 'em to 50 kc., pick out a prehistoric wobble around 7500 kc. Render ham radio and all of us a service. Move him to 7150. Then give him the dope on monitors and tell him to make a first-class one as described in his Handbook. Many amateurs do not realize the large number of stations that regularly and carelessly get off-frequency. Ten days this year we have logged as many as 20 different stations out of the amateur band. Twice, 35 different ones were beyond the legal limits. Then to think of some amateurs using monitors to tune just inside the point where they log these stations! Be sure you get your frequency from reliable standards. Use the every Friday transmissions of W1XP, W9XAN, and W6XK!

They're Following in Our Steps

By Danforth M. Googins*

EACH succeeding issue of the call book shows a large increase in new stations. Each new call represents another ham who is anxious to become a well-known and well-liked operator. Many articles about operating have been printed. Yet progress is slow and amateur radio is still far from the "Elysian Field."

Who started this idea of a long, drawn-out sign off for example? We have all been guilty of it, but some one had to originate the fad. It goes like this: "Wl om gess wl hr sign off nw es will hv to sa 73 (s) and gud luk es cu agn n hpe da dit dit dit da wl om 73 (s) agn es lotta luk es cul da dit dit dit da sure had fb qso so 73 es cul." The other station then answers with a bunch of the same stuff, and then we go back with a few more 73s, another "cul" and, if we are feeling real cute, we add that well-known "ahave-and-a-haircut...dit dit." Rotten radio, this. Let's learn to make our good-byes in certain snappy fashion, instead of following such practices which are more foolish than warm-hearted.

Another thing, whoever originated the idea of bombarding a brother ham with "OM" and "OB"? It may create a little enthusiasm in the newcomer to hear an old-timer

* W1CEQ, ORS, 56 Summer St., Kennebunk, Maine.

address him as "OM," but this everlasting repetition of "OM" and "OB" THROUGHOUT A QSO, merely increases the QRM and means absolutely nothing to the listener.

The new hams have heard some hay-wire operators work in this fashion, and they've followed! Even after these fellows tire of such foolishness, we still hear it being repeated by some of the less experienced hams. A good operator cannot help but wonder why such poor practices continue, why lids run in "OM" so often, and why they don't know enough to say simply "QRU" and "gb" when it's time to sign off.

I am not advocating the discontinuance of friendly chats—they are really worthwhile QSO's. Let's grow up and use "OM," "OB" and 73 a little more sparingly. More business-like procedure on the air will make us all proud of our hobby. Give the newcomers a higher mark to aim for. See that they hear good operating procedure, and then those new hams will not bring down gray hairs upon our heads!

Originating Traffic

By William K. Marks, VE3CP*

ORIGINATING messages is just as important as delivering messages, for the simple reason that a message has to be originated before it can be delivered—no new discovery.

Some fellows make no effort to gather up traffic, but always try to get a message to QSP. When such an operator does originate a dispatch, it is most likely a greeting of some kind. The thing that makes traffic handling interesting is to handle important traffic.

The main thing is to get well known around your town or city so that people will know of the good service you can give them. Go to your printer and have him print you a few hundred cards similar to business cards. On these cards have the name of your station, and also your own name, address and phone number printed, and in big letters have the following printed, "Amateur Radiograms sent free of charge"† to wherever you can QSP. List cities where you keep schedules as points for exceptionally reliable service. You are bound to get results, especially in the summer, when people are on holidays and like to tell the folks at home about the good time they are having.

Another good idea is to put a sign on top of your 50-footer or 30-footer so that it will attract the people's attention to the fact that they can send a "mag" anywhere they wish without paying out a lot of jack at the telegraph office.

I advise Canadian hams and others who live in a part of the country where severe ice storms cause much damage to telephone and telegraph wires to offer their splendid services to the local telegraph and telephone companies, stating that you will furnish them with reliable communication to nearby towns when their means of communication by wire has been destroyed. If by any chance your own power had been cut off, due to broken wires, they would be only too glad to supply you with dry batteries to run your equipment.

Article Contest

WE INVITE contributions on every phase of amateur communication activity. New ideas and viewpoints, criticisms of and remedies for conditions, hints on DX, suggestions concerning radio club organization, information on interference elimination, exceptional two-way communication work covering emergencies, athletic games and trips, timely attention to operating practice, commentary on radio-telephony, experimenting or development work in present-day amateur radio, data on low-power possibilities, 1750-ke. operation, etc., all are needed. Read the contributions presented in this department in this and the preceding two issues of QST. Then give us your views on different com-

*ORS, 283 West St., Brantford, Ont., Canada.

†See page 195, Radio Amateur's Handbook, for suggestions regarding proper mention of amateur radio station facilities.

munications subjects of interest and importance to amateur radio.

In addition to publication of all the best articles on timely subjects (on any phases of amateur communications whatsoever) in QST, the author whose article appears to have greatest value to amateur radio of all those received marked for contest consideration, has his choice of one of the following: (1) A copy of *The Radio Amateur's Handbook* bound in leather cloth; (2) six pads of message blanks; or (3) six of the new type A.R.R.L. station-log books. This offer will be continued until further notice.

—Communications Manager.

Traffic Briefs

SPECIAL! To Hudson Division Amateurs: A hamfest-picnic sponsored by the Nassau Radio Club of Oceanside, L. I., will be held on the afternoon of September 11th at Hempstead State Park. There will be facilities for all kinds of sports and amusements, and this get-together promises to be one of the best the Hudson Division has yet seen. Come and meet the gang! Follow the Southern State Park way to Hempstead State Park. In case of rain the hamfest will be held the following Sunday.

On making application to the Radio Division, holders of commercial operators' licenses who have held an amateur operator's license issued since January 1, 1928, will be issued amateur operators' licenses without further examination. To commercial operators who wish amateur licenses but who cannot immediately qualify under the above, we suggest that application for temporary amateur operator's license be made to cover operations during the next year, in which period it is likely they will have opportunities to take the exam.

CITY TRAFFIC NETS

The Detroit Amateur Radio Association's "D.A.R.A. Traffic Net" has become well known throughout the entire country as a dependable outlet for traffic coming into and leaving Detroit, as well as a good "traffic center" for traffic traveling east, west, north or south. (See page 47, April QST, for more data on the D.A.R.A. Net.)

In the Detroit Net one station is designated to make the deliveries for all other stations in the Net. By maintaining regular daily schedules with all net stations, this "delivery station" is enabled to clear their traffic for Detroit and vicinity, and make delivery of same. This leaves the other stations more time for relaying and keeping "through traffic" moving, and places the responsibility for deliveries on one man, who must account for all delivered messages when any questions arise.

We suggest that other clubs in the larger cities adopt "traffic nets" similar to that used in Detroit. The Cleveland (Ohio) Amateur Traffic Association is already making plans for a "C.A.T.A. Net" to handle the traffic rush of this fall and winter. In these nets one station is designated to handle net schedules one night per week; with the load distributed among seven or more stations in this manner, operation is made easy, and greater efficiency is possible with each station responsible only for operation on one night.

Organization and cooperation of radio clubs in the larger cities will give us a nation-wide system of "city nets," and will assure better deliveries and speedier relaying this fall and winter. Let's get started. Will you do your part?

Fred Hinds, W9WR-APY, SCM Illinois, announces the arrival of Carol Margery Hinds, born July 13th. Congrats, OM, and make an op out of her!

San Terry, Jr., W3AGH, Virginia Route Manager, has landed a berth as radio operator aboard the Motor Vessel Gilbert, WTEF, of the U. S. Coast and Geodetic Survey. WTEF works on 4135 kc., and "San" hopes to work some amateurs on 3.5 mc. All cards and letters are appreciated, and should be addressed to S. T. Terry, Jr., Radio Operator, M. V. Gilbert, U. S. Coast and Geodetic Survey, 808 Customhouse, Boston, Mass.

Invitation

All live amateurs: If you do not already do so, send your reports (DX, traffic, 'phone, r.c.c., experimenting, etc.) to your S.C.M. (address given on page 5) on the 16th of each month for the preceding thirty days' work. Get your report in QST. Make and keep your Section a leader by regular reporting!

56 mc. tests on September 11th are planned by the Vancouver (Washington) Amateur Radio Club. Tests will be held from hilltops in the vicinity of Vancouver and it is hoped that QSOs will be made from 50 to 100 miles. For details communicate with the club station, W7AIA, or "CQ Vancouver."

SCM Election Results

Newly elected SCMs have recently taken office as follows:

Indiana Arthur L. Braun, W9TE, Indianapolis.
Kansas* O. J. Spetter, W9FLG, Topeka.
New York City-Long Island M. J. Grainger, W2AUS, St. Albans, L. I.
Northern New Jersey Walter A. Cobb, W2CO, East Orange.
Ohio H. A. Tummonds, W8BAH, Cleveland.

Results of the balloting were as follows: Indiana, Braun, 45 votes; W. H. Cummings, W9FQ, 36 votes; N. Y. C.-L. I., Grainger, 139 votes; M. G. Sufferin, W2NO-AVP, 55 votes; A. L. Picard, W2WP, 52 votes. Northern New Jersey, Cobb, 84 votes; R. W. Maloney, W2BPY-COS, 31 votes; Ohio, Tummonds, 121 votes; F. R. Reed, W8BZL, 57 votes.

* Petitions for but a single candidate as Section Manager were filed in Kansas. Therefore, in accordance with our Constitution and By-Laws this candidate was declared elected.

BRASS POUNDERS' LEAGUE

Call	Orig.	Del.	Rel.	Total
W6USA	499	192	916	1607
W7BLH	191	393	532	1116
W3CXL	114	134	742	990
NYIAB	164	105	716	985
KAIHR	194	253	532	981
W3APN	302	412	117	831
W9TJ	40	127	486	653
OM1TB	253	113	278	644
W6PQ	272	112	250	634
W6AF	14	18	598	630
W7BB	223	309	84	616
W8EEQ	412	22	180	614
W8PP	25	46	513	584
W5CJ	55	19	492	566
K7FF	—	—	561	561
W8CNM	250	300	10	560
W9VS	30	121	432	583
W6ETL	64	129	338	531
W8BYD	173	64	289	526
W3BII	30	48	438	516
W3ARN	75	173	260	508
W6DQ	70	190	162	422
W6NF	212	142	60	414
W6AMM	209	192	—	401
W3BWT	109	122	166	397
W1MK	127	137	146	390
W8DD5	130	124	105	359
W6DER	32	108	222	362
W6BZZ	215	104	14	333
W7BSX	70	103	139	312
W6EKK	123	127	52	302
W6BZF	91	101	62	254
VE5DB	72	153	22	247
W9GUZ	103	121	12	236
W6ADH	53	114	50	217
W9GBP	31	108	74	213
W6YAU	32	161	6	199
W9FFY	33	105	12	153

Month of June 16th-July 15th. Note the stations responsible for above one hundred deliveries. Deliveries count!

A total of 500 or more bona fide messages handled and counted in accordance with A.R.R.L. practice, or just 100 or more deliveries will put you in line for a place in the B.P.L. Why not make more schedules with the reliable stations you hear and take steps to handle the traffic that will qualify you for B.P.L. membership also?

Relative Traffic Standings

(JUNE-JULY)

Messages Per Station (25%)	Stations Re- porting Traffic (25%)		Gain or Loss (Traffic Reports) (25%)		Traffic Total (25%)		Standing Based on Average of All Four Ratings %		Leading Section in Division	
W. G.	77.5	Pac.	224	Mid.	+38	Pac.	15737	Pacific	96.4*	Los Angeles
Pac.	70.2	Cen.	224	Pac.	+13	Cen.	9689	Atlantic	83.9	Western New York
N. W.	67.	Atl.	124	Atl.	+6	Atl.	7330	Northwestern	69.7	Washington
Atl.	59.1	N. E.	123	S. E.	+6	N. W.	5569	Central	66.1	Ohio
Hud.	49.7	Mid.	108	R. Mt.	+4	N. E.	4492	New England	66.1	Maine
Cen.	43.2	N. W.	83	N. E.	+3	W. G.	3953	West Gulf	62.5	Northern Texas
R. Mt.	37.1	S. E.	59	Dak.	0	Mid.	2552	Midwest	62.5	Missouri
N. E.	36.5	Roa.	57	N. W. +(+8)	-1	Hud.	2337	Hudson	44.7	New York City — L. I.
Can.	34.2	W. G.	51	W. G.	-3	Can.	1440	Dakota	41.1	Southern Minnesota
Dak.	29.6	Hud.	48	Can.	-4	Dak.	1422	Rocky Mt.	39.3	Colorado
Delt.	26.8	Hud.	47	Hud.	-7	Roa.	976	Canada	35.7*	British Columbia
Mid.	23.6	Can.	42	Roa.	-13	S. E.	787	Southeastern	32.1	Eastern Florida
Roa.	17.1	R. Mt.	20	Cen.	-14	R. Mt.	743	Roanoke	21.4	Virginia
S. E.	13.3	Delt.	15	Delt. +(+7)	-16	Delt.	402	Delta	12.5*	Arkansas

THE TEN HIGHEST SECTIONS

S. C. M.

N. Tex.	356.2	Los Ang.	77	Mo.	+35	Los Ang.	7461	Los Angeles	72.5	Nahmens, W6HT
S. N. J.	126.4	Mich.	77	Los Ang.	+25	Ohio	4133	Washington	60	Grubie, W7RT
E. Bay	117.4	Mo.	64	Wash.	+9	Wash.	3565	Ohio	57.5	Tummonds, W8BAH
S. C. V.	97.6	Ill.	56	E. Fla.	+9	No. Tex.	2528	Missouri	45	Canady, W9EYG
Sac. V.	95.8	Wash.	44	Ohio	+6	P. I.	2494	Northern Tex.	40	Taylor, WSRJ
Alaska	95.5	Ohio	44	Iowa	+5	Mich.	2228	Philippines	40	Liner, KA1SL
Ohio	94.8	W. N. Y.	42	San Fran.	+5	W. N. Y.	2145	Michigan	35	Stephenson, W8DMS
Wash.	93.9	Conn.	31	R. I.	+5	Ill.	1777	Western N. Y.	25	Farrrell, W8DPS
Wash.	81.	E. Pa.	28	W. N. Y.	+4	M.-D.-D. C.	1716	East Bay	20	Houston, W6ZM
M.-D.-D. C.	78.	Va.	26	E. Mass.	+4	E. Bay	1660	Southern N. J.	20	Adams, W3SM



LOS ANGELES is in her old stride and claims the Banner for the third consecutive month! She sets a new "all time high" in number of stations reporting traffic with 132 traffic reports; the previous high for traffic reports was Michigan's 119. Missouri continues to increase her traffic reports, leading in "gain or loss" again this month with +35. The Philippines maintains the lead in M.P.S. Instead of the usual seasonal decrease, this month we report a national gain of 41 in traffic reports!

During the traffic reporting month June 16th-July 15th, 1225 stations originated 14498; delivered 12182; relayed 30759; total 57439. (84.1% del.) (46.8 m.p.s.)

* Unchanged from previous month.

* No reports were received from the Hawaiian, Manitoba and Mississippi Sections this month.

* The "Gain or Loss" standings for the Divisions containing the Idaho, Louisiana and Tennessee Sections are determined by comparison with the April-May figures since no traffic reports were received last month from the SCMs of those Sections. Actual "gain or loss" figures from May-June are given parenthetically and are used in computing the "gain or loss" for the whole field organization.

ZL2WL — KETCH "WATER LILY"

ZL2CD, Secretary of the Wellington Branch, New Zealand Association of Radio Transmitters, reports that the auxiliary Ketch "Water Lily" left Wellington in June, this year, bound for England via the South Sea Islands, Borneo, Dutch East Indies, Singapore, Calcutta, Ceylon, around African coast by Capetown and via Gibraltar. The cruise is expected to last another 17 months. U. S. amateurs are asked to listen for this expedition, which uses the call ZL2WL, and is working for W.A.C. on the 3.5-mc. band. Reports and ZL2WL traffic for the next year may be sent via ZL2CD.

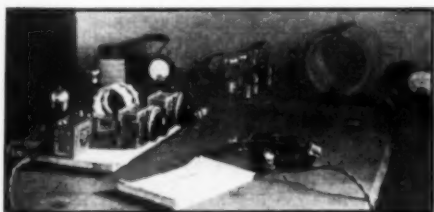


IMK — 1914

We present IMK, which is identified by the list of stations published by A.R.R.L. in the summer of 1914 as belonging to Mr. Thurston A. Johnson (first-class amateur license) Winthrop, Mass. The list includes the following additional information, "1/2 K.W. transformer, rotary spark gap, maximum sending range 15 miles." Other features shown in the photograph are the DeForest "onion" detector, navy-type 170-600 meter tuner, send-receive which, Murdock phones, early type variable condenser, and oscillation transformer. Note that the "juice" flows in through the pipe in the wall — also the "kickback preventer" on the wall.

The predecessor of the present-day WIMK operated by A.R.R.L. Headquarters was a neat, typical, installation of "spark" equipment for its time, and the "maximum sending range" was by no means to be looked down upon in those days before the widespread amateur use of the higher frequencies.

Our thanks to Mr. Walter Butterworth, Associate Radio Inspector of Federal Radio Commission office at Boston, Mass., for this photo to add to our IMK-history.



IMK, 1045 MAIN ST., HARTFORD—1924

Yep, Lorenz-wound coils, brass-base UV200 and 201 tubes in the most up-to-date breadboard receiver of its day. Note the four UV202's in parallel in the 77-meter transmitter, also the 4-inch diameter r.f. chokes in the leads from plus and minus h.v. The 500-volt d.c. generator and an antenna high and well in the open were the best features in this station installation. The prize atrocity in this Hartley rig was the 11-inch diameter RCA edgewise-wound tank coil of more than a score of turns! This was an example of how not to avoid high coil distributed capacity, dead-end coil losses, excessive local fields, etc. In spite of the low-C high-loss transmitting condensers and general deficiencies which it possessed in common with all early c.w. station construction and design, this station worked in commendable fashion. Installed by Traffic

Manager F. H. Schnell, and operated from the A.R.R.L. office itself by volunteer shifts of operators (most all of the Hq. staff of that time), this station managed to clear a good amount of Hartford-bound traffic regularly each noon-hour.

This station took part in some of the earlier A.R.R.L. daylight-transcons, predecessors of the 'phone-c.w. relays of this later day. While seldom operated for purely DX work, the station "got out" about as well as any 20-watt rig of even the present day. The 1924-1925 QST-file gives some idea of the traffic totals of this and other stations of the day. In February, 1925, this 77-meter rig worked Netherlands, and the records show other DX of the time. We vividly recollect the skepticism with which other members of the Headquarters staff greeted the report on the first foreign contact.—This skepticism was not dispelled until we were able to show the European cards reporting the Headquarters station of that time. We are indebted to "FS" of W9UZ for the photo of this first A.R.R.L.-IMK layout, which is reproduced herewith.

Now we are looking for a "snap" of the 50-watt 1711 Park Street A.R.R.L. station, to complete the records leading up to the regularly operated Headquarters' station of to-day, made possible by action of the A.R.R.L. Board of Directors in 1927, and first on the air in February, 1928 (description in December, 1930, QST).

Wanted—Stations to Send Code Practise

EVERY year at this season we devote space in this department to the listing of schedules of 1750-kc. amateur stations which broadcast information and code instruction to beginning amateurs. As this issue goes to press we are going over our list of "code practice" stations preparatory to presenting a revised list in the November issue. Newcomers to the amateur ranks are learning to rely upon the 1750-kc. transmissions of stations sending code instruction, and during the last season many were able to bring their speed up suitably to enable them to secure licenses. The new men need code practice more than anything else, instruction in amateur operating practice, and two-way work with patient, experienced operators as soon as they secure their licenses to increase their proficiency in using their stations. Thus it is that we are calling for volunteers to send code practice in the 1750-kc. amateur band. Don't you want to help out by offering your station and a few hours of your time each week to these beginners?

Both c.w. and radiophone stations can engage profitably in broadcasting and two-way work for beginning "hams." Radiophone volunteers are really preferred, however, as by using both microphone and key instruction can be given most efficiently to the listeners. Last season those who took part in this work had gratifying results and built up large audiences and many friends, who listened regularly as soon as the schedules were announced.

If you have a 1750-kc. 'phone or telegraph transmitter and can engage in this most worthwhile work, please drop us a line at once, giving data on your exact frequency, hours of schedules, etc., and prepare to follow your schedule as soon as it is in print. We shall be glad to send you some mimeographed ideas and helps which will assist you in putting this service over to those who copy your transmissions.

Traffic Briefs

W3BWT suggests that hams visiting other amateurs take their operators licenses along if they hope to operate other stations! Visitors must show their tickets before they operate W3BWT, or any other bona fide amateur radio station, in accordance with government regulations.

"W" amateurs who like to work DX and have snappy rag chews at the same time should watch for PAOGO on 7 mc. W2CIM says he is on from 7 p.m. until past midnight (E.S.T.), almost every night, and sure comes in with a bang! Watch for PAOGO, fellows; he's watching for you.

WIBEZ tells of hearing a 'phone, working in a band crowded with QRM, calling another station as follows: "Calling the first district station that just called CQ!" We nominate this chap for "the world's greatest optimist!!"

Report Your Traffic

Whether one or a hundred messages are handled, whether your work is mainly of experimenting, DX, traffic, or 'phone interest, whether you are an A.R.R.L. member or just buy QST at the newsstands, your SCM (see address page 5 each QST) welcomes and invites your report. Mail it on the 16th of each month for the preceding 30-days work! Let him know your plans for amateur work and what you are doing.

WIMK Operations

OFFICIAL AND SPECIAL BROADCASTS to A.R.R.L. Members are transmitted from WIMK (the Headquarters Station) on the following schedule:

Sunday	8:30 p.m.	E.S.T.	3825 & 14010 kc.
"	Midnight	"	3825 & 7150 kc.
Monday	8:30 p.m.	"	3575 & 7005 kc.
"	10:30 p.m.	"	3575 & 7005 kc.
Tuesday	8:30 p.m.	"	3575 & 7150 kc.
"	Midnight	"	3575 & 7150 kc.
Thursday	8:30 p.m.	"	3825 & 7005 kc.
"	Midnight	"	3825 & 7005 kc.
Friday	7:30 p.m.	"	3825 & 14010 kc.
"	10:30 p.m.	"	3825 & 7150 kc.

WIMK maintains regular schedules with the following: On 3500-kc. band: W1AFB, W2BDN, W2CGD, W3BWT, W3CXM, W3CXL, W8BBH, W9ENH, W9OX. On 7000-kc. band: W6WB, W6USA, NY1AA, VP2PA. On 14000-kc. band: NY1AA.

The revised fall-winter operating schedule of WIMK will appear in October or November QST.

The transmissions of Official and Special Broadcasts from WIMK are made by an automatic transmitter and, being sent at about 15 words per minute, afford splendid code practice for those recently entering the "ham game."

Official Broadcasting Stations

(CHANGES AND ADDITIONS)
(Local Standard Time)

W2AMT	7020 kc. (c.e.) Mon., Wed., Sat., Sun., 7:00 p.m.; Sun., 9:00 a.m.
W3QP	7297 kc. (c.e.) Fri., 9:00 p.m.
W6AFU	7250 kc. Tues., Thurs., Sat., 2:00 p.m.
W6BCK	7248 kc. (c.e.) Mon., Wed., Fri., 6:30 p.m.
W6EXQ	7184 kc. (c.e.) Mon., Wed., Fri., 5:00 p.m.
W8BON	3512 kc. Mon., Wed., Fri., 6:00 p.m.
W9CTB	3800 kc. (CW) Wed., Sun., 6:30 p.m.

Traffic Briefs

G5MP, Hythe, Kent, England, announces daily "test transmissions" on 28 mc. during August and September. He is anxious to obtain schedules with "W" amateurs in connection with experiments with directional antennas.

Late and Additional Reports

NY1AB reports a splendid traffic total which places him fourth high in the BPL. W9IPM sends the following news from Kansas: The "Heart of America Radio Club" has been organized in greater Kansas City with Herb Hollister, W9DRD, president. Meetings will be held on the first and third Thursdays of the month. W9BQV has a 211E on 3.5 and 7 mc. W9FHE is using MOPA. W9FDO is working DX on 1.75-mc. 'phone. W9BNU is back on 3.5 mc. W9BYS is working 7-mc. c.w. and 1.75-mc. 'phone. W9IPM's BCL neighbor wanted to know what the fire escape was doing on his antenna! W9HRS has a 50 wattner on 7 mc. Traffic: NY1AB 985.

DIVISIONAL REPORTS

ATLANTIC DIVISION

WESTERN NEW YORK — SCM. Don Farrell. W8DSP — W8DSS leads all ORS in traffic. W8AWT turns in a nice total. W8FDY is putting in crystal control. W8AOW has a schedule with W6USA. W8DBX is moving back into town. W8FOL reports a new ham in Lancaster. W8HJJ. W8AQF is doing a lot of good work at the big glider meet in Elmira. He reports three new hams in Elmira. W8HKK. W8HKG and W8GZV. W8AJ had an FB Naval Reserve cruise. W8BDK says the Gloversville gang have gone crazy over 56-mc. 'phone. W8BFF is busy handling traffic at the glider meet in Elmira. W8QL is QRL farm work. W8DEQ was QSO the SCM. W8DME keeps busy with the Naval Reserve. W8AED had his station ruined by a bolt of lightning. W8DSP has been rebuilding. W8DGR is having trouble with his remote control system. W8CMW took traffic from U.S.S. Hydrographic W.T.E.I. for the Philippines and gave it immediately to W6USA, who had a schedule in a few minutes with the Philippines. W8DHU was on three weeks' vacation. W8BFG is rebuilding his 14-mc. transmitter. W8QB has been QRL the OW's garden. W8BGN has been trying out some perdetos as doublers and quadruplers. W8AFM reports Mr. Hebert attended the R.A.W.N.Y. meeting on June 29th. W8BLH is working full time now. Father Healy of W8BLP reports 14 mc. dead. W8JE leads the Section with his traffic total. W8AUI. W8GQM and W8FZX are portables handling the traffic for the National Glider meet in Elmira. All work is done on 56-mc. 'phone. W8BOM has been sick for two weeks. W8DMJ sends in his good report. W8GWT says his outfit perking FB. W8GWZ plans on going to Florida for the winter. W8EMW has a new YL op born June 30th. W8GU is searching for DX on 14 mc. W8FFU sends in his first report. He was formerly W4BBB. W8AKX says his tent at C.M.T.C. Plattsburg is a regular ham headquarters. W8FFL has a new portable receiver. W8AGS reports a new call, W8HNY, in Amsterdam. W8DES is QRL outside activities. W8HJQ is working hard organizing U.S.N.R. in Deposit. W8HGR reports for the first time. W8AN has a schedule with W8DSS. W8ECF keeps Watertown on the map. W8DHQ reports direct to HQs. W8CJJ is busy at the glider meet. W8EUY will be back with his 3567-kc. crystal job soon. W8BHK was married on June 22nd. W8BR is at summer school in Ithaca. W8EWC is busy with Boy Scout activities. W8BWY has his station closed for the summer. W8AVI reports for first time. W8CP is using a 50-wattner. W8FOY and W8TZ are busy on 56 mc. W8APU is handling traffic again. W8FXX has new 56-mc. transmitter and receiver. Anyone interested in making tests on 56-mc. band with Syracuse stations, please write the SCM.

Traffic: W8DSS 248, W8AWX 140, W8FDY 121, W8AOW 96, W8DBX 81, W8FOL 78, W8AQF 63, W8AJ 52, W8BDE 52, W8BFF 43, W8QL 34, W8DEQ 33, W8DME 12, W8AED 11, W8DSP 10, W8DGR 9, W8CMW 7, W8DHU 3, W8ECF 63, W8CJJ 26, W8EUY 3, W8BHK 3, W8BR 2, W8AGS 11, W8DES 16, W8BQJ 22, W8JE 303, W8AUI 177, W8GQM 144, W8FZX 61, W8BOM 45, W8DMJ 37, W8GWT 12, W8GWZ 12, W8EMW 6, W8GUJ 6, W8FFU 6, W8AKX 5, W8AVI 22, W8AN 40, W8EWC 9, W8DHQ 21.

SOUTHERN NEW JERSEY — SCM. Robert Adams. 3rd, W3SM — W3ZI is at Camp Pine, New York, operating 3ZZU with the National Guard. W3AGT at Hanover sent in his first report. W3ARN with two operators made the Brass Pounders' League. W3ARV had a nice total. W3QL reports his new rig all ready to go. W3BPT worked his twenty-fourth country. W3ADL is on four frequency bands. W3BPD will be located in the Garden State Fair next month. W3BEI is having power supply trouble. W3AYA is ready to handle traffic to Wildwood and Cape May. W3AEJ and W3BWC are rebuilding. W3SM spent considerable time on 3.9-mc. 'phone. The Bloomfield Radio Club and the South Jersey Radio Association were guests of the Delaware Valley Radio Association at their first anniversary. Eight ORS appointments were cancelled for failure to report. While this action seems drastic, it is justified. We must have reports, and they should be in on time. Get be-

hind the wheel, fellows. W3APN kept schedule with Yacht Grusius, WRDZ.

Traffic: W3AEJ 7, W3ADL 30, W3ARV 113, W3SM 32, W3AYA 10, W3BPT 12, W3ZI 4, W3BEI 15, W3QL 58, W3BQN 6, W3BPD 7, W3ARN 514, W3AGT 5, W3APN 531.

WESTERN PENNSYLVANIA — SCM, C. H. Grosarth, W8CUG — This being my first report as SCM for W. Pa., I wish to extend my thanks to the gang, and I shall try to give you the same cooperation you have enjoyed in the past. W8DLG leads the Section. W8FKU, a new ORS, reports two new hams, W8GLA and W8GSJ. W8AJE lost his job. W8DRO found trouble in his MOPA. W8CMP reports from northern Michigan where he again has W8CIK on the air. W8CPE is working 1.75-mc. 'phone. W8CRK says too much heat. W8EDG has been sick. W8CAX is home from college. W8AQU sends in his first report. W8FAK reports by radio. W8AZG says 7 mc. dead at times. W8CQA complains of summer weather and vacations cutting down his total. W8KD is working on 14 mc. W8AVY is trying to locate 56 mc. W8DVZ has a portable call W8ZBC for 56 mc. W8VI is building a new transmitter. W8ASE is getting a new crystal. W8GRA is a new ham in Huntingdon. W8DKL has changed his transmitter again. W8FOG has been admitted to Princeton University. W8CFR reports in person. W8ECH will be on three bands soon. W8DDU and W8BFZ are trying 56 mc. W8CAF is experimenting with E-C oscillators. W8EFR has completed his transmitter. Two new hams in Washington are W8HET and W8GOM. W8CUG's 60-foot stick broke in a recent storm. I wish to announce the appointment of two new Route Managers in the Section, W8DLG, Brookville, Pa., and W8AJE, 310 Second St., Oakmont, Pa. These fellows may be consulted regarding schedules and will be willing to help you move your traffic.

Traffic: W8DLG 161, W8FKU 125, W8CUG 97, W8EDG 78, W8AZG 34, W8CAX 28, W8AQU 14, W8CQA 14, W8AJE 12, W8DVZ 10, W8CPE 8, W8DKL 8, W8CRK 6, W8DRO 5, W8KD 2, W8FAK 2, W8AVY 2, W8CFR 2.

MARYLAND-DELAWARE-DISTRICT OF COLUMBIA — SCM, Harry Ginsberg, W3AOO, Bob Hensell, W3BAK "Ed" Hudson, RM; W3BWT "Ed" Darne, Chief RM. W3NY — The Section is going strong for 56-mc. work; such men as W3DG, W3APS, W3ZK and some of the Western Maryland gang are making fine progress. The Frederick Radio Amateur Association has finally gotten settled in its shack 6 miles north of Frederick. Under W3CMG, they now have Dynatron, monitor, receivers, and transmitters going in first-rate order. W3CJS made 70% of his total in deliveries, with W3BWT and W3CXL 31% and 14% respectively. District of Columbia: W3CXL keeps up his fine work. W3BWT makes the BPL on delivery. W3ASO finds the heat not conducive to radio work. W3IL Q8Oed England. W3CDQ asks for ORS suspension to go in for 56-mc. work. W3NR is rebuilding to crystal control Maryland: W3CJS, non-ORS, leads Maryland in total, and the Section in percentage of deliveries. W3AOO will try his hand at 56 mc. W3SN is rebuilding. W3CDG likes his first ORS bulletin. W3NY has deserted traffic for work. W3BTE has a pair of matched '10s in P.P. T.N.T. W3BGI says W9FO forgot him — QRA 4204 Roland Ave., Baltimore. W3ZD is keeping schedules with Holland. W3ZT will be on with 50-watt MOPA. W3ADO is installing 'phone. W3BHE helped QSP several messages for Australia. W3BKC is stepping out FB. W3JK says a big gang awaits the RI for exams. W3AFF is still battling with heat. W3WN is trying his 1.7-mc. portable on the mountain. W3HT will soon join the ORS ranks. W3BR has some real 'phone equipment. W3BYT is driven from his shack by the heat. W3AVD is having trouble getting out. W3AHG will be off the air for the summer due to the loss of his antenna pole (metal) in an electrical storm. Delaware: W3BAK is off for the summer. W3HC is working on a 56-mc. rig.

Traffic: W3CXL 990, W3BWT 397, W3CJS 63, W3AOO 57, W3SN 37, W3CDG 30, W3NY 25, W3ASO 24, W3BTE 22, W3BGI 16, W3ZD 10, W3ZT 8, W3IL 7, W3CDQ 7, W3ADO 6, W3BHE 4, W3BKC 4, W3NR 2, W3JK 2, W3HC 2, W3BAK 2, W3AFF 1.

EASTERN PENNSYLVANIA — SCM, Jack Wagener, W3CS-W3BF — W3AQN is high man this time.

W3AIP was heard in Germany on 3.5 mc. W8FLA says that W8AXH's transmitter is full of cobwebs. W3AKB won two new '10s and a "C" battery at a club meeting. W8CVS has started up again. A first report was received from W8FJF. W3MC came back on 3.5 mc. for a while. W8CFF's crystal jumps like a pussy cat. W3AMR is going to Penn. State. W8EOH wants an ORS. W3BCD is sticking with us. QRN, QR-HEAT, etc., has slowed W3AHD down for the summer. W3ANZ had trouble with his transmitter this month. W3BPX now has his crystal rig going strong. W3MG is on 56-mc. 'phone. W8VD has been shooting rats and snakes. W3BYS reports for Glenside. W3BUI worked his first "7." W3BF and W3BUH have been off awaiting station license renewal. The wind blew W3HTP's pole down. W3BRZ has been working lots of DX. W3EO is now up on 3.5 mc. Watch W8EU's totals after his YL op grows up. W3OK has QTA schedules for the summer. W3BRH handled a bunch. W3AAD says crystal is in high gear now. W3BDX reports for first time. The Quakertown Radio Club has a new shack. W3NA is saving his sheekles for a crystal. W8AFV now has a 75-watt final amp. W3QP reports better results on his daily schedule with VK-land. The Western Radio Society is planning a "hidden transmitter hunt."

Traffic: W3AQN 116, W8AFV 115, W3BRH 111, W3AIP 88, W8FLA 87, W3OK 83, W3BYS 2, W3AKB 77, W8CVS 74, W3AAD 67, W3NA 53, W8FJF 44, W3MC 40, W3BUI 1, W8CFF 40, W3EO 40, W3AMR 36, W8EOH 24, W3BCD 21, W3AHD 19, W3BF 17, W3BDX 17, W3ANZ 16, W3BPX 12, W8EU 6, W3MG 5, W3QP 4, W8VD 2.

CENTRAL DIVISION

WISCONSIN — SCM, Harold H. Kurth, W9FSS —

Howdy, Gang. This is my first report as SCM, and I sure appreciate the support you have already shown me. It's a keen job and I like it. W9HHD at Camp Williams leads this month. W9FAW was operator there. W9FSS is rebuilding his transmitter. W9DKA is shut down for the summer. W9EEQ is a newcomer in the traffic game. W9IZW and W9AQU are holding schedules with W9HGA at the Y.M.C.A. camp at Plymouth. W9ZY-RM reports little activity in western half of state. W9FAF signs his report as the "Air Hog." W9IQW sends his good wishes to the new SCM. W9VD, our former SCM, sends his offer of any assistance needed. W9ISD wonders if anyone else has noticed the QRN on 3500 kc. W9ESZ says conditions on 3500 kc. unusually good. W9BIB has a neat portable rig. W9AVG, W9HMS and W9FLX report. W9DKH is sailing on the "SS F. W. Green." W9GVL is experimenting with portables. W9EYX spends most of his spare time at his lake cottage. W9HSV is on the air awaiting traffic. W9FPB has moved his transmitter to W9EBI at Viroqua. The Milwaukee Radio Amateurs Club will hold its annual picnic on August 28th at Waukesha Beach. W9IUZ plans to resume operations as soon as school starts. W9FSS is picnic chairman. W9JDP and W9JXU are new hams. W9HNX and W9IDG are working on 3.5 mc. W9FAV reports traffic.

Traffic: W9HHD 101, W9FSS 68, W9DKA 19, W9EEQ 17, W9IZW 15, W9ZY 13, W9FAF 10, W9IQW 10, W9VD 9, W9ISD 5, W9FLX 4, W9ESZ 2, W9BIB 2, W9AQU 6, W9FAV 25, W9AUX 5.

ILLINOIS — SCM, F. J. Hinds, W9APY — RM, E. A. Hubbell, W9ERU. W9VS has been commended for the emergency work he did for the Military Order of Guards while the latter's station was out of commission. W9CTP, W9VS and W9DOU are doing fine work with W6USA on the Olympic Game traffic. W9BIK just crashed through with 83.6 on a broadcast ticket and is hamming with traffic on W9IMQ. W9AOV has improved his note. W9DJM cured the AC receiver trouble. W9JOH is a new ham in Kankakee. W9DBO made a couple of home-made bugs. W9IEP is sporting a new VT 2. Troubles with the MOPA at W9AAK. W9GHT now has the fifty going. W9IUL is knocking them off on 14 mc. W9ERU is attending Federal Radio Institute at Milwaukee. W9BTT and W9HUU pepped up the Rock River Radio Club with traffic contests. W9IYA is building a '10 rig. W9IYA and W9IVF will operate W9JWS at Springfield, Ill., and Camp Grant, Rockford, Ill., during training seasons. W9HQH has a beautiful new crystal outfit. W9IEP is planning a 70-foot mast. Transmitter troubles at W9AAR

are all cleared up. W9JO has completely rebuilt. W9APY has a brand-new YL op. W9FST has an output of 50 watts now. Illinois is mighty sorry to hear that our Central Division Director, W8ZG-W8GZ, was slightly gassed in the mine riots. OK now. W9BSR is our newest Official Observer. W9FGN is out for Olympic Game traffic. W9IVG is doing well with the '10 Hartley. W9IUF has a dandy portable under W9JHO. W9IPY is on 14, 7 and 3.5 mc. W9AMO is on 1.75-mc. 'phone. W9FRA has changed QRAs. W9ANQ and W9CUH are working hard for Waukegan Hamfest. W9CNO handled a lot of the Democratic National Convention traffic, all on 14-mc. 'phone. W9FTX is off the sick list now. W9ICT gets RAC reports locally while getting PDC reports at distances. W9FO and W9HGC have consolidated in marriage. Congratulations, folks. The real W9GEP has been cleared of the responsibility of the lid who used his call off-frequency. W9FXE is taking his Commercial renewal exam. W9FDN is breaking in his cousin to become a ham. W9HQH is studying antennae. W9BVV was reported in England. W9FPN has a fine new shack. W9HPK has moved. W9BPU is getting out nicely on 7 mc. W9BYZ will be found on 3.5 mc. W9DJG is rebuilding. W9DPD, W9IEP, W9DBO and W9ARX had a splendid 4-way QSO. W9KA got his biggest Ham Radio kick when he QSO'd K7TF on 7 mc. W9GFU has moved to Columbus and will have W8AEL on from there. W9DOU is authorized unlimited 'phone. W9BSR is a new O.O. W9PK is working on a new crystal rig. W9FCW is doing nice traffic work. W9BRX is devoting entire time to grid modulation for 14-mc. 'phone. W9BLD worked J1DO and J1EC. W9FZG and W9DGK are on 3.5 mc. with crystal. DX poor at W9BIR. W9EZV, W9EXS, W9AOD and W9FGV all live within four blocks of each other. W9NN is joining the A.A.R.S. W9AVB is trying to take X-Ray pictures with RF. W9HFK says he is going to join the upper-class of Hamdon by installing a crystal rig. W9IJA is putting in crystal, also.

Traffic: W9VS 583, W9CTP 232, W9CGV 73, W9PK 59, W9DBO 57, W9DOU 55, W9FGN 53, W9HFK 45, W9APY 39, W9CNO 38, W9GVX 37, W9CUH 34, W9IEP 33, W9CZL 32, W9BTT 31, W9HUU 30, W9AVB 19, W9JO 19, W9ERU 18, W9LW 18, W9FJB 17, W9BIR 15, W9FST 15, W9FRA 14, W9HPK 13, W9DPD 12, W9EMN 12, W9FGV 12, W9GA12, W9HQH 12, W9IJA 11, W9BTU 10, W9IUF 9, W9BVP 8, W9BYZ 8, W9FGD 8, W9ILY 8, W9FDQ 7, W9DGK 6, W9FDN 6, W9BSR 5, W9DJG 5, W9IPY 5, W9KA 5, W9AAR 4, W9BPU 4, W9CEO 4, W9FCW 4, W9GZW 4, W9IVG 3, W9IYA 3, W9NN 3, W9RO 3, W9BLD 2, W9HNK 2, W9BRX 1.

INDIANA — SCM, George Graue, W9BKJ — W9EXL is the star traffic station this month. W9CVQ is a close second. W9JRO is a new station in Indianapolis. W9CKB is awaiting a tube replacement. W9FYB will have an '03A perking soon. W9BXT is rebuilding. W9HSF is the latest addition to the ORS family. W9HUF and W9AJK report for the first time. W9AB is closed temporarily. W9DUZ's license has been changed to portable. W9EGE has an '11E in final stage. W9HUO has a 56-mc. rig perking. W9BZF built a condenser mike. W9CHA'S receiver has gone haywire with QRN. W9JRK has two ops. W9ABW is on again. W9HPQ expects to be an ORS as soon as he gains speed. W9FQ is QRL with rod and reel. W9JZZ is a new station in Valparaiso. W9JIW is building a portable rig. W9TE is the new Indiana SCM. W9FDY tries 1.75-mc. 'phone. W9EWQ is working on a crystal. W9FKI has QRO. W9EXL has portable W9JYX. Elkhart 56-mc. 'phone is going over big. W9YB is closed for the summer. W9AKJ is building an E.C. frequency meter. W9JHQ has a crystal rig on 7 mc. W9CRZ has changed to MOPA. W9DHJ reported his traffic direct to HQs. The retiring SCM has enjoyed the splendid cooperation from the gang and trusts the fellows will give the new SCM, W9TE, their full support.

Traffic: W9EXL 213, W9YB 89, W9AKJ 40, W9BKJ 39, W9GGJ 40, W9CRZ 20, W9FKI 13, W9GYB 12, W9TE 5, W9FPQ 4, W9HPQ 4, W9ABW 3, W9JRK 2, W9CHA 2, W9HUO 1, W9CVQ 191, W9DHJ 23.

KENTUCKY — SCM, J. B. Wathen, III, W9BAZ — W9JL gets higher total than our consistent performer W9BWJ. W9CIM is off until he gets new crystal. W9DKD is adding '41 buffer. W9OX wants to know if W9JO is KY's first ex-YL op? RSVP. W9ACS has the portable call

W9JPB for the summer. W9AUH has been QSO W6URA. W9BAZ says the A.R.R.L. Treasurer doesn't like ya in Ky. mint-juleps. W9CXZ is off until license is renewed. W9DDQ reports being QSO 21 countries during month. Not much kick to W9FZV's '47. W9QT is back once more. W9IFM says you can't work much DX with a lone '41. "All schedules on vacation," reports W9HAX. W9WDS moved to New Florence, Mo. W9BAN has at last discovered the enchanting possibilities of YLs. W9EQO will start traffic with next report. W9EDV is not settled yet. W9EDQ has license changed for new QRA. We hope that W9FQJ is back with us to stay. W9CDA was severely cut in the sailing arm while putting new antenna through window. Beginning with the September 15th reports, mail them to the new SCM.

Traffic: W9JL 187, W9BWJ 118, W9CIM 66, W9DED 62, W9OX 44, W9ACS 17, W9AUH 14, W9BAZ 8, W9CZL 7, W9DDQ 7, W9FZV 3, W9QT 3, W9IFM 2, W9HAX 1.

MICHIGAN — SCM, R. J. Stephenson, W8DM8 — Acting SCM, W8AKN, W8DYH, W8DZ (Miss), W8FX and Mary! SCM W8DMS is out at Grayling "vacationing." Can you beat it, Gang, 90 of our Michigan crawled out of the ol' swimmin' hole long enough to read the Bulletin and return their enclosed report cards for a total of about 2250 messages! Emphatically FBI! W8PP wants to know where the Detroit "die-hard" are. W8AEQ is back from W860. W8FX missed the BPL. W8RX and W8CFM are both proudly displaying the future president. Let's go you W8JX's! W8QT's solution: For answer to CQ WEST: CQ east, north, or south. W8DFE is getting set for DARA news starting about September 1st. W9FSK is Army netting. W8DHC (our DX-er) kicks through. W8CPH reports another Silent Key — W8GUT. W8CST is "gonna" crystal on 3540 kc. W8EHD (our Millington hot-cha) continues to total 'em. Yes, W8FTV, it is possible for your crystal to be off-freq! W8BJG clicks Monroe Bels when W8PP leaves them alone. W8GRN says that W8CPH got SO sunburned that he had to stay up all night working DX. W8EGI is in the swim with W8HCC. W8DZ (Mr.) invites Steve to a swim. W8EYH portables with W8ZZBB. W8AKN says: "Let's Mary and W8FX fight and the winner buy him a hamboiger." W8EZM we'll nominate you for president if you keep up the good work. What's this? — W8BJ rejuvenating? W8EFI is QYL — we guess. The boys up around the thumb organized — Bay Radio Club — W8CUX President, W8DA Secretary and money man — 28 members already. Jackson organized and Pontiac went so far as to buy a lake cottage for their club — W8JO promises to exert himself with the Lansing boys . . . Escanaba is getting in line, as is Laurium . . . C'mon, Marquette. Oh, you W9HK! We think we notice signs of John becoming effeminate after getting the call — W8HER. W8DFS is hot under the eaves??? W9GQF is crouching for a September 1st spring. W9DPQ claims that nature is over-ruling his better sense! W8DED worked J1DO, J1EC, J1DM and HAF2D same day. W8EEM is on lots but doing little. W9IOV is seconding the motions at W9EXT. W8CFZ. Shame . . . why the extra broadness on our poor overcrowded bands? W9AAM reports on an old 1922 Spark/CW "Operating Dept., A.R.R.L." report card! Greetings: W8FQD. W8DDO is back and hot. W8AIU is at W8HFB punching toward Detroit. W8CSX invites the gang to visit "a regular club-room" at Pontiac Radio Club. W9VL has some old commercial first tickets for sale. W8BIK is moping over an MOPA. W8HL sends us some goose-eggs. W8AKN and his red-head have "phiffitt." W8COW (portable W8SM) also lays goose-eggs . . . "watta cow." W8EBQ is on 56 mc. W8GP wants a job. TOO! A complete summary will be found in DARA "TFC" Bulletin sent without cost to all stations reporting to SCM on 16th of EACH month. Let's get the hay-wire outta the ol' junk and then hit the ball as an organized group in September.

Traffic: W8PP 584, W8AEQ 299, W8FX 163, W8GHP 130, W8HFB 107, W8DFE 104, W9FSK 57, W8DHC 44, W8CPH 43, W8CST 41, W8EHD 40, W8FTV 40, W9DAB 40, W8BJG 25, W8GRN 32, W8BTP 25, W8QT 25, W8BG 24, W8GUC 18, W8EGI 17, W8JO 16, W9IHM 14, W8ECN 14, W8EFI 14, W9HK 14, W9IOV 14, W8GWA 13, W9CGP 13, W8GQB 12, W8AUB 11, W8BJ 11, W9CE 11, W9GJX 11, W8BNS 10, W8DDO 10, W8GBB 10.

W8EAM 9, W8AJL 8, W8BUH 8, W8DZ 8, W8CEU 8, W8CFM 8, W8EYH 8, W8HER 7, W8DA 6, W8DFS 6, W8EJ 6, W8EVI 6, W8WW 5, W8DPQ 5, W8GQF 5, W8BAW 4, W8DED 4, W8DYH 4, W8GQS 4, W8NR 4, W8WO 4, W8GOJ 4, W8CCP 4, W8AQZ 3, W8DWL 3, W8MV 3, W8CEX 3, W8EEM 3, W8EXT 3, W8AAM 2, W8CFE 2, W8PQ 2, W8PFF 2, W8UD 2, W8AAF 1, W8CWR 1, W8FQD 1, W8GDR 1, W8GWB 1, W8WR 1, W8HC 1.

OHIO—SCM, Harry A. Tummonds, W8BAH—In the BPL this month we find W8EEQ, W8CNM, W8BYD and W8DDS. District No. 1, W8BYD, RM: Through the resignation of W8DVL, who is working out of town, we announce the appointment of W8BYD as RM of this district. A concrete pedestal for the 100-ke. bar standard frequency checking equipment is a new feature at W8CJO. W8DDQ is busy with club picnics. New crystal outfit at W8GLI. "Playing with 56-mc. 'phone," reports W8EFW. W8FNX has a new rig going. W8AGI says only 496 short of the BPL. Renewed ORS ticket at W8DHI. Nice report from W8AAZQ. "Watch my smoke when I get W9JUC schedule," reports W8GME. W8UC has a nice report. More done on ORS requested by W8FFK. "Officially announce my candidacy for A.R.R.L. Director Central Division," says W8AXV. W8ENJ will do better next report. W8ACZ says best DX "ZL." W8EBY handled four messages from Guam via W8USA. W8BMX is off air awaiting station license. W8CET handled traffic for V.F.W. Convention at Elkhart, Ind. W8GUL sends another FB report. Due to his father's illness W8DDS has not had as much time on the air. W8ERT is a former Navy operator, signing HX. District No. 2, RM W8BKM: W8EJ will be off the air until September. W8BKM has new rig all set. District No. 3 (RM vacated): First report from W8EKJ. W8APC has ordered a new crystal. Another new reporter from Delta, W8CMY. District No. 4, RM W8EEQ: W8GQ wants a job. First report from W8DQY. Nice letter from W8GXL. Totals going up at W8AFU. W8GXQ applies for ORS. "Basement so damp guess will have to move out," reports W8PO. Our hat is off to W8EEQ, who leads Ohio this month. District No. 5, RM W8DFR: W8BSR is starting in service work. W8EXI is using an MOPA. W8HCP worked W5CJZ. W8BZL is now chief operator at AB2, Camp Perry. W8FGV is a welcome new reporter. W8DFR is awaiting station license renewal. District No. 6, RM W8BBH: W8ARW says it's too hot to operate. A nice letter from W8HEY. W8BPN, Columbus, is at new QRA, 121 Arcadia Ave. Take a look at these real schedules which RM W8BBH is holding daily: W8PP, W8BWJ, W8GLD, W3AOC, W1MK, W8BAH, W8FUT, W8DR. W8CNM is at Camp Perry for few weeks. District No. 7, RM W8VP: W8ANS is rebuilding for fall and winter. W8CKX has been taking traffic from W7USA. W8VP is on duty from 2 to 5 p.m. District Nos. 8 and 9, RM W8CGS: W8CUL is now on c.w. First report is welcomed from W8GES. Weather conditions terrible at W8CGS. W8ALQ is waiting to get Commercial ticket traded for an Amateur first. W8EQB will see the gang at the Cleveland Convention. W8DVK is trying 1.75-mc. 'phone. W8GXC will like to hear from 1.75 and 56-mc. hams in his locality. W8BWM is back on 7 mc. W8GVL couldn't quite make the grade. W8GCA is trying 1.75 mc. W8DYD is the old reliable on 1.75-mc. 'phone. W8GLJ surely has a nice note. W8FFK can't seem to cherish QSA 3's. W8FVT lost out. W8ELE will be in harness very soon. W8FYO says DX in every state on 3.5 mc. W8FFW has a very clever QSL card. W8BAH thanks the gang for their cooperation and will see you at the A.R.R.L. Central Division Convention, Cleveland, Ohio, September 2nd and 3rd.

Traffic: W8EEQ 614, W8CNM 560, W8BYD 526, W8EBT 415, W8DDS 362, W8BBH 272, W8PQ 266, W8BAH 256, W8VP 79, W8CMY 79, W8ALQ 66, W8APC 61, W8GUL 62, W8DFR 60, W8CKX 48, W8CZT 45, W8PGV 44, W8BMX 41, W8BKM 31, W8EY 28, W8GCS 24, W8ACZ 18, W8GXQ 18, W8BPN 15, W8ENJ 14, W8HCP 14, W8AXV 12, W8EQB 11, W8FFK 11, W8UC 9, W8HEY 8, W8EXI 8, W8AFU 8, W8GME 6, W8GXL 6, W8ZQAQ 6, W8ARW 6, W8DHI 5, W8GES 5, W8AGL 4, W8FNX 3, W8EFW 3, W8GLI 1, W8EKJ 1.

DAKOTA DIVISION

SOUTH DAKOTA—SCM, Howard T. Cashman, W9DNS—W9CFU has unlimited 'phone permit. W9GYG is installing '66s. W9BLZ is getting into his old stride. W9FOQ is building a 56-mc. outfit. W9DKJ is at new QTH. W9AQB is with the Army. W9CAU is putting up a new antenna. W9IDW built a new crystal rig. W9EUH is vacationing in Minnesota. W9FLI is coming on with a 50-watt 'phone and CW rig. The So. Dak. Convention was a big success. RM W9DKL says we need west schedules. W9GRJ is finishing a new shack. W9IQZ keeps a VE4 schedule. W9CGH reports good luck with a new 56-mc. outfit.

Traffic: W9BLZ 208, W9FOQ 3, W9FMP 17, W9DNS 2. **SOUTHERN MINNESOTA**—SCM, H. Radloff, W9AIR—W9CZS, the portable of Route Manager Gierke, saw service with distinction at Fort Ripley when the 151st Field Artillery encamped for summer training. W9BN is our most reliable traffic outlet to points West and Northwest. W9FFY made 260 telephone calls to crash the BPL in deliveries. W9CTB keeps a schedule with the St. Paul Boy Scout Camp station at Stillwater. W9BNN finished construction of a FB 56-mc. receiver. W9BKK misses the QRM since W9HCW left Lambertson! W9JBA is manager of the West Concord Telephone Company. We are informed the power transformer at W9AQH-W9HCC weighs 26.5 pounds. W9FBV and W9IXQ make application for O.O. W9HXR is pleased with the performance of his new transmitter. W9AFR uses the skywire to dry bathing suits on. W9FJK was silent for two weeks while the OM went soldiering. W9HRH has a sun tan like No. 12 enamel. W9FCS will give 1.7 mc. a try. W9GFA kept a test schedule with W9FNK. W9IJD, OM and YF, enjoy visitors. W9DGH handled important traffic with W9GIT. W9EYL has a new electron coupled frequency meter. W9GUX desires an outlet for European traffic. W9EPD is some 56-mc. work. Our sympathy goes to W9DRG, whose home was razed by fire. W9FNK puts his portable, W9ZZA, through the paces during vacation. Swimming and other sports for W9COS. W9DH has '47 in crystal stage. W9GLE drops radio for a full vacation. W9HFF reports W9JQA and W9KAV new Minneapolis stations. W9JEF and W9JUZ, Montgomery; W9JMK, Redwing; W9KDI and W9IDF, Northfield; W9JUM and W9JVA, Mankato, are other new ones. W9GBZ was host to a gang of Iowa and Minn. hams. ExW9BNF sends 73 to So. Minn. from W3LA. W9FMB vacations in Iowa. W9DEI works 1.7-mc. 'phone and 14-mc. c.w. W9BXC is planning a 250-watt 'phone. W9DZC is making a comeback. An 80-foot stick scratches the Heavieside at W9IRH. W9ATP is scouting for a 250-watter. W9EPJ wants 1 KW! W9AGO rebuilt to work three bands. W9CYA is getting the usual DX. W9HZU plans 56-mc. tests. W9DIS was an out-of-state visitor to the Minneapolis gang. W9JHG uses ham radio to keep in touch with home. W9AKN is canoeing in the North Shore country. W9ELW is trading junk.

Traffic: W9CZS 228, W9BN 180, W9FFY 153, W9CTB 109, W9BNN 27, W9BKK 24, W9JBA 22, W9AQH 20, W9IXQ-W9FBV 20, W9HXR 18, W9DH 16, W9AFR 12, W9FJK 9, W9HRH 8, W9FCS 7, W9GFA 7, W9IJD 6, W9DGH 4, W9EYL 4, W9AIR 4, W9GUX 2, W9EPD 1, W9FNK 1, W9DRG 1.

NORTH DAKOTA—SCM, Wm. A. Langer, W9DGS-W9IFW—W9HJC, newly appointed Route Manager, leads the traffic handlers, and requests cooperation in lining up intra-state routes. W9HRP held open house during the Stuteman County Fair. W9GNS is now employed at Bemidji, Minn. W9BVF is dismantling the outfit for a few years. W9DHQ schedules the SCM tri-weekly. W9CRL is preparing for big season. W9DYA is using portable call W9JTI while awaiting license modification. W9DM prepared three recruits for amateur exam while in camp. W9DGS is utilizing lull in traffic to rebuild.

Traffic: W9HJC 76, W9DGS 49, W9HRP 44, W9GNS 38, W9BVF 10, W9DHQ 7, W9CRL 6, W9DYA 2.

NORTHERN MINNESOTA—SCM, Palmer Andersen, W9DOQ—Our Ex-SCM is getting a thrill out of working the new super station, W9HCC, which employs the last word in amateur transmitters. W9BRA had a fine trip

to Great Lakes. W9JIE is a brand-new man. W9HZ has a schedule going 100%. W9BBL says the radio shack is too hot. W9HDN is back on the air at Noepeming. W9HCW is finally on the air again. W9HIE handled Hawaiian traffic. W9IAA is pushing his '10s with 600 volts. W9HRB and W9GYH are going in for 'phone. W9HNS is keeping daily schedules with W9IPA. W9DPP reports on the Range boys. W9HTI is active on 3.5 mc. W9GWR is experimenting with a 1.75-mc. 'phone. W9DOQ is on at intervals. W9GKO is experimenting with 56 mc.

Traffic: W9BAR 3, W9HTI 3, W9DPP 3, W9HRB 1, W9HNS 14, W9IAA 2, W9HIE 13, W9HCW 1, W9BRL 5, W9HZ 6, W9JIE 14, W9DOQ 12.

DELTA DIVISION

ARKANSAS—SCM, Henry E. Velte, W5ABI—W5BML won the last ORS and A.A.R.S. contests. W5BPE is in the Missouri hills trying to forget the YLs. W5VK has new portable call, W5ZZAH. W5PX is often seen out looking for crystals. W5ABL worked NY2AB on 7 mc. W5BDW is on a trip through Mississippi. W5BDB reports traffic. W5AKB is on 14 mc. W5ADT is announcer at KLRA. W5JK blew his 5-year-old type '10. W5BED has been visiting hams throughout the southwest. W5ABI has QRM from work. NOW IS THE TIME TO PLAN TO MAKE ARRANGEMENTS FOR THE BIGGEST EVENT IN THE ENTIRE YEAR—"ATTEND THE MID-SOUTH CONVENTION" TO BE HELD IN PINE BLUFF, ARKANSAS ON OCTOBER 15TH AND 16TH. FOR FULL INFORMATION AND RESERVATIONS WRITE OR WIRE TO: W5SI, E. RAY ARLEDGE, TONEY FIELD, PINE BLUFF.

Traffic: W5BML 204, W5ABI 20, W5JK 15, W5ABL 9, W5BDB 6, W5BDW 4, W5BED 1.

LOUISIANA—SCM, Frank Watts, Jr., W5WF—W5BZR reports for the mob in his territory. W5CDQ is in Woodboro, Texas, with portable call W5ARY. W5CBT is still jerking soda. W5AQC is still working on locomotives. W5APA is working them far and wide. W5BBW has a '10 on 7000 kc. W5CKC is new ham in Minden. W5BZR reports working ZL and K7. W5BTH has crystal rig on 3.5 mc. W5IG has PP TNT on 7 mc. W5BQD schedules W5BKV daily. W5ADJ is in Jonesboro. W5BGO has been off air couple of months. W5BYX handled quite a bit of traffic. W5CFF and W5CFG are brothers. W5CMV is new ham in Shreveport. W5WF will be kicking out a wallop again one of these days.

Traffic: W5BZR 77, W5BYX 32, W5APA 1.

TENNESSEE—SCM, James B. Witt, W4SP—W4EX has moved to 7 mc. W4ABR handled some traffic on 14 mc. W4AXO has moved to Greenville. W4AHD is building new transmitter. W4ATE sends in his first report. W4SW is back on the air. W4ANC has portable call 4ZZAD. W4AQV has his portable W4PEQ at the National Guard Camp at Tullahoma. W4JC is getting out FB on 14 mc. W4HL is putting up 50-foot poles. W4BAX is having power trouble. W4AJJ sent in nice report. We need more reports from stations handling traffic!

Traffic: W4ABR 10, W4ATE 8, W4EX 8, W4RO 6, W4BKU 1.

HUDSON DIVISION

NEW YORK CITY AND LONG ISLAND—Acting SCM, E. L. Baunach, W2AZV—Well, gang, this is my last report as Acting SCM and I want to thank all hands for their support. Our new SCM is W2AUS, and I want everyone of you to give him your full cooperation, in order that our Section will be above all the other sections. We can do it, so let's show them. W2FF is working plenty DX. W2BGO says traffic is on a vacation. W2QM says W2ALX is back on the air. W2BCL can be heard on 7 mc. W2SC keeps his schedules. W2AUS is moving W1NS to new QRA. W2ADQ still holds his high traffic score. W2BNL is operating W2ZZH on 56 mc. W2BDJ is off for the summer. W2PF is 56-mc. conscious. It is with deep regret that I report that W2AGC, on July 4th, while putting up an antenna for his portable in the country, fell 75 feet and broke his back. I wish all of the gang would send him QSL cards to make him feel good while he is in the hospital. W2DBQ is quiet at present. W2BNY is behind 300 watts on 3.5 mc.

W2AZV belongs to the five-star inner circle of the U.S.N.R. W2WP works W1CJD every day. W2CYX keeps a schedule with his 2nd op at camp. W2AKL is looking for new schedules. W2CWP just moved to new QRA. W2AWT relayed traffic to Africa via EAR96. W2ASG handled traffic for the ELK Convention. Due to misunderstanding of ye SCM, I had said that W2CCD was a member of the N. Y. bar. Although he passed his exams he will not be admitted until October. W2CBB is back home again. W2DOG's YF moved him to the back room. W2AHO's receiver covers 200 degrees on the dial on the 3.5-mc. band. W2LB just returned from way down south. W2BAS worked L. I. for a change. Hi. W2VL is trying a '60. W2CHK has his new crystal rig perking. W2CYA is a new man in Stony Brook. W2BVB is too QRL to have more than one schedule. W2EET reports for the four horsemen, W2AGL, W2CQG, W2EES and himself. W2BJ and W2DKB are at the beach operating W2ZZDK on 14 mc. W2AXI sends in his first report. W2DQK and W2DRG took a bicycle trip to Mystic, Conn. W2BQK's '52 is going strong. W2API is now W6FZQ in Phoenix, Ariz. W2CUD is sailing around N. Y. Bay in his canoe. W2COI says the same old gang. W2AYI has the ham radio itch again. W2BGM is working on dynamic mikes. W2BEG is still making chain lightning with his bug. W2BFG has passed exam for unlimited 'phone; he is looking for schedules and traffic.

Traffic: W2FF 97, W2BGO 7, W2QM 53, W2SC 100, W2AUS 98, W2PF 14, W2AZV 22, W2ADQ 394, W2WPA 1, W2CYX 40, W2AKL 5, W2VL 15, W2BAS 21, W2AWT 11, W2ASG 21, W2DOG 8, W2AHO 105, W2CHK 52, W2BVB 23, W2EET 12, W2DQK 32, W2CO 147, W2BQK 9, W2BJ 48.

EASTERN NEW YORK—SCM, R. E. Haight, W2LU—W2BJA and W2EEP, known as W2BTK, are to be commended in the traffic work they carried on at Camp Smith, Peekskill. W2BER, W2BZZ, W2BLL and W2LU aided. W2ACB is back from the west coast. W2UL reports QRL. W2BLL schedules Boy Scout Camp. W2CUL is active on approx. 3815 kc. "Thanks to W2BLU," reports W2KW, "another pole went up at Radio Hill." W2CFU is rebuilding with '52. W2BLU reports static room hot. W2ANV is re-vamping for U.S.N.R. drills. W2BJP is on with P.P. 32 PA. W2CJS is QRL at work. "Duplex great sport," reports W2CTA. W2BKL sends first report. "Asia and I'm WAC," says W2ACY. W2DVF reports new stations W2EEK, W2EGE, W2EGQ, W2EIB, W2DGD and W2DYM. W2BXH works all districts on 14 and 7 mc. W2BZZ reports things quiet on the Hudson. W2CQH is QRL for another degree at State College. W2BKM is in new QRA. W2AEH is new member in VCR. W2BSH is raising corn stalks for antenna masts. W2CJP is back on 14 mc. W2CGO is vacationing at Boston. W2BIA surprised the gang with crystal on 3.5 mc. W2DUG is still hammering brass. W2OP is in camp pounding the stones. W2EAL and W2EAX are using crystal.

Traffic: W2BJA 312, W2LU 214, W2EEP 119, W2UL 36, W2BLU 26, W2ACD 24, W2WK 15, W2CFU 13, W2BLU 13, W2EAL 12, W2ANV 10, W2BJP 7, W2CJS 3, W2CTA 3, W2BKL 3, W2ACY 1.

NORTHERN NEW JERSEY—SCM, Walter A. Cobb, W2CO—The new SCM wishes to thank those who supported him in the recent election, and assures the personnel of the Communications Department in this section that he will continue the cooperation shown by Art Wester, W2WR, for the past eight years. W2CBY leads the Section in traffic. A QSO with Siberia on 14 mc. cooled W2CJX off for a short while. Three different transmitters on air in one week in record of W2CNL. 100% rag chew is traffic report for W2CFY. A new portable transmitter is the apple of W2AKC's eye. Jersey National Guard encampment, Pine Camp, N. Y., is the source of nice traffic total for W2DQJ. Just when DX starts coming back to the call of his lonely '10, W2BJZ gets a letter from the power company stating that he will have to go back to receiving tubes and battery supply, unless —? W2DYF has moved from Irvington to Whitestone, N. Y. W2ABT finally got going at new location. Twenty-two members of the Bloomfield Radio Club journeyed down to Morrisville, Pa., on July 20th, and had a joint meeting with the Delaware Valley and South Jersey Associations. W2EII is new station at Union City. W2DMG a new ham in Arlington, is looking for schedules.

Traffic: W2CJX 22, W2CNL 20, W2AKC 23, W2DQQ 20, W2CBY 65, W2BJZ 3, W2ABT 37.

MIDWEST DIVISION

NEBRASKA—SCM, S. C. Wallace, W9FAM—W9FWW heads the list this time. W9DMY says weather too hot to live. W9DI wants the gang to send him their dope so he can line up traffic routes. W9EHW is also using W9AAF, portable. W9EEW reports. W9DGL is building new power supply. W9BQR is going to National Guard camp, August 1st. W9FXQ has new a.c. receiver. W9HTU is still hitting hard. W9FAM visited W9EDI, Lincoln.

Traffic: W9FWW 33, W9DMY 20, W9DI 11, W9EHW 10, W9AAF 1, W9EEW 2, W9FXQ 5, W9HTU 45.

IOWA—SCM, George D. Hansen, W9FFD—W9EIV, RM; W9BPG, RM. W9EIV leads off this time. W9IO says the station will be closed until September. W9FFD handles a few. W9GP is on once a day. W9IFI, an old-timer, is with us again. W9CWG says schedules are off for the summer. W9DMX is on 'phone and c.w. W9GWT is on 7 mc. W9EOE is experiencing trouble with the MOPA. W9BFL had a 50-watter go west. W9BWF reports 56-mc. activity. W9ABH will try 1.75 mc. for c.w. W9FZO is working on crystal. W9ABE confines his efforts to 14 mc. W9AHX is back from California. W9EMS reported via radio. W9JCS is a new ham. W9ACL reports a summer slump due to heat. W9AFQ has trouble with the skywire. W9HOH is arranging for more schedules. W9AYC's power transformer went west. W9GPL plays around with his new receiver. W9DFK says it's too hot. W9DNZ is getting ready for a big season. W9FYC says, "No schedules, no traffic, too hot, no 'ambiah.'" W9ERY is still looking for the "juice." W9FEB is going to locate the shack at the top of a 100-ft. observation tower. W9HOH says that, after he gets the frequency creep out of the P.P., then he is ready for business. W9BPT says baseball and business still hog his time.

Traffic: W9EIV 30, W9IO 29, W9FFD 26, W9GP 25, W9IFI 25, W9CWG 17, W9DMX 14, W9GWT 13, W9EOE 12, W9BFL 11, W9BWF 10, W9ABH 6, W9FZO 6, W9ABE 5, W9AHX 4, W9EMS 3, W9ACL 3, W9AFQ 2, W9HOH 1, W9AYC 1, W9GPL 1.

MISSOURI—SCM, C. R. Cannady, W9EYG-HCP-JPT—RM, Wm. Atkins, W9TJ. Boy, OH BOY! What a report! SIXTY-FOUR stations reporting traffic for 115% gain in ONE MONTH. An excellent start, but LET'S DIG out those hold-outs and make this jump above ONE HUNDRED! And let's run over to Jefferson City for the MISSOURI Convention, August 27th-28th! W9TJ placed high man in Missouri traffic this month, and also took the lead in the SCM's ACTIVITY CUP for 1932-33. REMEMBER one message a month—reported—adds another traffic station to OUR LIST. St. Louis: W9AAU-W9ZK reports convention plans for '33. W9HUZ applies for ORS renewal. W9FTA says too hot to go for traffic. W9GTK has rebuilt his entire outfit. W9GSO is off the air temporarily. W9HVP is on occasionally. W9CCZ has new 50-watter. W9ILI moved. W9HVC has crystal on 1.75-mc. 'phone. W9FYW is coming back from the river. W9GTK reports that W9ECE of Cape Girardeau visited with him. W9DUD-W9EWT will try to be at Missouri Convention. W9PW reports hot weather and moving. W9GDU says, "See you in Jefferson City."

W9LIJ reports an asset added to the station—"A YEAR'S SUBSCRIPTION TO QST AND A HANDBOOK." W9LJO is visiting in the country. W9HVN is practicing baseball with the Cardinals. W9HVJ has another blanket report. W9HWE is working VKs quite easily. W9HEL still works 'em. W9HVC is coming up with crystal rig. W9HHK has new '10 outfit. W9TA is moving to better quarters. W9FCH favors 14 mc. to 7 mc. W9DUD, President of the St. Louis Amateur Radio Club, sends in report for that club; W9GBV moved to Little Rock, Ark. W9GTF has new MOPA. W9HJL has little to say. W9AUB has beautiful new crystal rig. W9DGI-EOW is now using crystal. W9FFW is now located at Van Buren, Ark. Kansas City: W9RR-W9ZZ was off the air all month. W9AOG hooked Siam and Japan. W9BVN is pounding brass between tricks at WDAF. W9BKO is heard occasionally on 7 mc. W9AHY is battling crime at the K.C. radio plant. W9AEK is considering a trip to the MISSOURI Convention. W9GDD is

getting the sweetest job in this part of the country on for KMBC. W9GAU says traffic plentiful. W9FPI is back home from New Orleans with Commercial ticket. W9HFC is moving. State News: W9TJ handled rapid fire messages with OM2TG and is keeping schedule with W6USA. W9HVV says too many RAC notes on 7 mc. W9INI is having trouble with new rig. W9IUR reports number of stations on 1.75 mc. increasing. W9DVD is building portable for vacation. W9DXU of Liberty says QRM makes operation anything but pleasure. W9JTK with same QRA says it's "best location in the world." W9ZZV handled rush THREE-MINUTE message and answer for the RM. W9CRM reports W9IGX, W9CXB, and W9GAR will be ready to go again soon. W9CAK wants some 56-mc. plane tests. W9FSL is rebuilding. W9GBJ sends in FB reports as his FIRST SINCE 1924! W9ARA will try to be at the Missouri Convention. The Amateur Radio Club of Hannibal reports. The club is planning a ham gathering for sometime in September. W9HBJ and W9IRR are building a new rig for the clubhouse and will use the call W9KEM. W9GBC is President and W9FSZ Secretary. W9FGJ, W9FSB, W9HSZ, W9CNX and W9EFZ are all taking part in the activity of the club. W9AIJ attended the Fourth of July celebration, which was held in honor of W9BJA, at Brunswick, who is planning to move to Kentucky. W9IOU sends FB report. W9CUT reports for the Osark Amateur Radio Association. W9CLQ was recently heard in Japan. W9IGW is endeavoring to work some DX. W9ASV is off with a blown-down antenna. W9ENF has been rebuilding. W9DHN reported early. W9BAH of Sedalia is recommended for ORS. W9GBS is rebuilding. W9BGW has the much wanted license. W9FYM reports that 35 hams, YLAs, OWs, etc., registered at Brunswick for the FOURTH OF JULY CELEBRATION. The get together was held at FYM's shack. The South Missouri Association of Radio Amateurs: W9BJA is sick again. W9CJR-W9FEH visited in Brunswick and Kansas City. W9FVM-W9CON is new ORS. W9EYG-HCP has added W9JPT to the string. W9EHS and W9FYU report too much QRM. W9HUG is having receiver trouble. W9DUM is in Van Buren, Ark., for the summer. W9GMT is grinding crystals for a new rig. W9IXO is rebuilding.

Traffic: W9TJ 662, W9FPI 85, W9JTK 66, W9GAU 48, W9CRM 46, W9DHM 44, W9AEK 42, W9BGW 34, W9HFC 28, W9ECE 27, W9BVN 25, W9BAU 25, W9FTA 22, W9CJR 20, W9HVN 18, W9EYG 18, W9GBJ 17, W9DVD 17, W9AHY 17, W9CUT 16, W9ENF 15, W9IGW 13, W9IUR 12, W9HVV 12, W9DUD 11, W9CXU 11, W9HVC 9, W9DGI 9, W9JPT 9, W9IXO 8, W9HJL 7, W9EOW 7, W9EWT 7, W9HCP 7, W9EME 7, W9ZZV 6, W9GDU 5, W9PW 5, W9IOU 5, W9HVJ 5, W9HUZ 4, W9DCD 4, W9BIU 4, W9FYU 4, W9FSL 4, W9FYM 3, W9AOG 3, W9HUG 3, W9CCZ 3, W9IGJ 3, W9GTK 2, W9INI 2, W9HWE 2, W9EHS 2, W9FVM 2, W9HUI 2, W9AWE 2, W9ILI 2, W9EVW 2, W9FEH 2, W9CZI 2, W9CON 1, W9BAH 1, W9DUM 1.

KANSAS—SCM, O. J. Spetter, W9FLG—W9FLG wishes to express his appreciation for the many congratulatory messages and letters he has received since his election. Thanks, and I will do my best. W9CET has been a real SCM and has built up this Section and put Kansas on the map. Good luck, John. W9GUZ leads the Section this month. W9GBP is moving to Manhattan. W9GBP was listed last month as W9GPB, and asks to have the error corrected. W9BGL is operating on 14 mc. W9BNU is back on the air. W9GCL is getting ready for fall A.A.R.S. activity. W9EHL has been enrolled as a member of the Day-Mule Net (?). W9CFN reports QRL work and tennis. W9HL entertained W9RR. W9DEB is rebuilding between Kan-Hams. W9FFO is an ORS applicant. W9CXW reports QRL. W9ESL took time out for a vacation. W9GXV has three new crystals. W9IDM says QRN and QRL. W9CJT had W9FFO, W9EDU and W9GGK visiting him. W9EYY has a new Zepp. W9BXP is rebuilding for 1.75-mc. 'phone. W9FYU says weather too hot. W9FLG is very busy with convention. W9KG keeps the air hot with schedules. Don't forget the biggest and best convention ever, in Topeka, September 10th and 11th.

Traffic: W9GUZ 236, W9GBP 213, W9DEB 32, W9FFO 27, W9FLG 31, W9HL 15, W9CFN 10, W9IEW 9, W9GCL

6, W9BNU 5, W9BGL 3, W9HLE 1, W9CXW 1, W9KG 83, W9GXV 2.

NEW ENGLAND DIVISION

NEW HAMPSHIRE — SCM, V. W. Hodge, WIATJ — WIAPK has a new W.E. 3-stage speech amplifier. WIAVG is on with a 250-watt 'phone. WICMR has his TPTG '10 going again. WIDMI has combined with WIELJ. WIAUY says he is working more and more with the key, and says it's FB. WIAEF is on 1.75 mc. with 'phone. WIEEA and WICEA are working with him. WIIP is taking a vacation and has cancelled his schedules. WIUN hopes to have the Appalachian Mt. Club Huts hooked up by radio soon. WIBAC is holding down a hut at Lonesome Lake. WICCM has a new superhet. WIEES is on in Portsmouth. WIDVG wants hams in the vicinity of Hanover to write him if they are interested in forming a club. WICGP of NHU is now at Lake Wallis in Canaan, Vt. WILY is on with a VT-2. W1AXL has been busy washing dishes due to illness in the family.

Traffic: WIIP 100, W1AXL 36, WIUN 23, WIAPK 6, WICMR 6.

WESTERN MASSACHUSETTS — SCM, Earl G. Hewinson, WIASY — Your new SCM wishes to express the Section's thanks to Mr. Peloquin for his fine work during the last two years as SCM. W1ZB has requested to be put on the inactive list. W1BSJ has turned painter for the S.R.A. W1AQM spends his time on 56 mc. at Mt. Wachusett. W1BNL has a new crystal outfit. The Worcester Radio Association has closed up for the summer. W1ATF has given up that call for WIDGW. W1BVR is working on 14 mc. W1NS is taking care of lonesome YLs at Lake Nipmuc. W1ERG and W1ESX are new hams and members of The Blackstone Valley Club. W1OIF is still on 56 mc. W1AUQ promises traffic competition in the fall. W1CWP is a reporting station. W1AIC and W1COI report new Hoosac Valley Radio Club with the following officers: W1NH, President, W1CTI, Vice-President, W1AIC Treasurer and Secretary. W1DHW reported late for newspaper articles. W1APL has worked 18 counties. W1BVP is the new RM. Schedule requests should be made to him. W1BCX has rebuilt to MOPA. W1AFI wants reliable schedules. W2 stations just won't QSP, says W1AJD. W1DCH reports traffic handled from Uncle Sam's forts. W1AZW has at last tried his hand at 'phone. W1ATK is 56 mc.ing under the call of W1ZZD. W1CGL gets all his volts from a kerosene engine.

Traffic: W1BWY 47, W1ASY 42, W1OIF 39, W1APP 11, W1AQM 10, W1APL 6, W1AMI 34, W1NS 30, W1AIC 18, W1BCV 9, W1CWP 6, W1AFI 80, W1AJD 54, W1ARH 14, W1AZW 12, W1ATK 12, W1BCX 139, W1DCH 47, W1DJQ 14, W1CGL 1.

MAINE — SCM, John W. Singleton, W1CDX — W1BOF is the traffic king this time, and wins a wall sign for his station. W1CDX is a close second. W1BOZ is busy with his duties as President of the Waterville Radio Club. W1AQW handled some important "sick" traffic. W1BEZ is doing a fine job as Official Observer. W1BEU sends in the usual fine total. W1ATO has changed his address to 22 Caldwell Street, Portland. W1CFG is busy experimenting on 56-mc. equipment. W1CRP is busy pushing traffic. W1DHH has applied for an ORS ticket. W1APR sends in his second report. W1BLI resigns as RM. W1BGZ reports plenty of activity in Berwick. W1BWS has returned to his home in Conn. W1EEY has won his ORS ticket. W1BYP sends in a good total. W1DIN is blowing filter condensers. W1BTC is increasing power. W1DPR is busy with plans for the coming hamfest in Portland. W1BWO is very QRL. W1CEQ has cancelled schedules for summer. W1AXJ is converting to crystal control. W1EF is busy. W1APX is experimenting with 56 mc. W1CPT is still working the "league of nations." W1DIJ has a new bug. W1AJC has offered the facilities of his station for use in the tests to determine the effective height of the Kennelly-Heaviside layer during the eclipse in August. W1DZU is getting the 56-mc. bug. W1DFQ is working 1.75-mc. 'phone.

Traffic: W1BOF 299, W1CDX 209, W1BOZ 112, W1AQW 26, W1BEZ 92, W1BEU 86, W1ATO 31, W1CFG 78, W1CRP 74, W1DHH 70, W1APR 55, W1BLI 52, W1BGZ 52, W1BWS 47, W1EEY 33, W1BYP 31, W1DIN 11,

W1BTC 8, W1DPR 7, W1BWO 6, W1CEQ 4, W1AXJ 2, W1EF 1, W1APX 1, W1CPT 25.

EASTERN MASSACHUSETTS — SCM, Joseph A. Mullen, W1ASI — The M.A.R.S. is keeping things well stirred up. The North Shore Club has a drive on for new members. W1ASI is keeping a one-way schedule with W1AKN, who is up in the woods of Wareham with only a receiver. W1ABG had a general blow-up of power supplies. W1KH has a new 56-mc. National converter. W1VS turns in as high man regardless of summer QRM. W1WU reports condenser blowout. W1WV added his 56th country to his list. W1ABF reports a '30 running with a plate voltage of 6 volts. W1AGA is our latest 00 in New Bedford. W1BZQ passes us five messages via 56 mc. W1CAW decided that ORS are not at home until they get back to 3.5 mc. Canada will be privileged to have one of Eastern Mass. ORS in the person of W1BBY late this month. W1CHR has portable W1BOV on the air. W1ATX is working portable from North Kingston, R. I. W1CUO has migrated to the front porch for the summer. W1BFR is back on 3.5 mc. W1ME went to 14 mc. with his '52s. Vacation is over for W1AAL. W1BGW is sitting tight awaiting the FRC to finish their vacations and license his new QRA. W1BMW says the active season for business is on. W1DFS is making preparations for National Guard traffic. W1AOV reports for the first time. He is only 14, and if his ORS papers pass the new acid tests he will supersede W1AK as the Section's Jr. ORS. W1CSG has a new crystal outfit. W1SC is shut down undergoing summer overhauling. W1ALP, one of Eastern Mass. old-timers, is pumping electrons from his new Quincy QRA. W1CGB has acquired a new slogan, "One Case of Good Beer." W1BO reports a Japanese QSO on 7 mc. Will the Secretaries of ham clubs please get in closer touch with the SCM? The SCM signs a two weeks' QRT from radio of all kinds. You don't have to be an ORS or A.R.R.L. member to be mentioned in these reports. Let's hear more from you fellows. W1ESK is a new reporter. W1ACH has QRT until fall. W1CQN has new 56-mc. transmitter.

Traffic: W1VS 143, W1BGW 67, W1KH 41, W1AGA 33, W1ABG 32, W1CGB 30, W1CUO 25, W1BZQ 24, W1ASI 24, W1CAW 22, W1AAL 21, W1BFR 15, W1ME 15, W1AOV 14, W1DFS 11, W1ATX 10, W1CSG 9, W1WU 8, W1BBY 5, W1BMW 4, W1ESK 17, W1CQN 11.

CONNECTICUT — SCM, Fred A. Ellis, Jr., W1CTI — W1MK has a fine total for hot summer weather. W1CJD gives us a line on some of his local gang. W1DWE and W1AEV are fooling with 56 mc. W1BFH has "boat QRM." W1AUT is trying CW again. The Middlesex County Radio Club is having a relapse during the summer heat. W1API advises that the HCARA has discontinued meetings until September. W1BNP says there are three active stations in East Hartford now. W1AJB keeps a schedule with W3ADM. W1BFS and W1CVL were visited by W2DQK and W2DRG. W1BQS says W1CMP is building a 500-watt 'phone. W1BYW has a '10 in a Hartley. W1BIH is rebuilding. W1DGG handled important traffic for San Francisco. W1APW will increase power to a '52. W1COA has been fooling with 56 mc. W1BEO spent his vacation in the White Mountains. W1FL is active on both 3500 kc. and 56 mc. W1CAP turns in his first report. W1BHM was off due to blown '03A. W1CNU uses a 14-mc. doublet for receiving. W1BVV is getting ready for winter traffic. W1ASP has been appointed Commander, Unit 5, Section 1. Naval Communications Reserve. W1BNB QTA'd schedules for the summer. W1ATW reported direct to HQs. W1BWS just moved into Conn. from Maine. Welcome to the Nutmeg State, OM. While "FH," W1BDI, was on his vacation, "Ev" put W1UE on the air. W1TD is getting out better. W1DFT wants to know if there is a ham with a television rig on the air. (Yes, W1BGR). W1AQF is revamping transmitter. W1AMG is nearly ready to break loose with his new crystal transmitter. W1ES was away from Headquarters on a trip. W1CTI, W1BGJ, W1DOW and W1BAX report traffic. W1IJ recently moved to Conn. from N. H. W1EAF expects to try some portable work this fall. W1EAF reports three new hams in Danielson, W1DLX, W1EJP and W1EJQ. W1ATW entertained W1EDN, W1AJS, W1DVX, W1EFD, W1DWP, W1CQF, W2DKP, W1KK, W1DXT, W1DFR, W1AZA and W1DLY at his station. W1VN and W1ADW paid a visit to W1CBA. Extra! W1CJD offers

another of his famous QSL cartoons to the Conn. station handling the most traffic for the month September 16th to October 15th. WIBNP won the first one so is not eligible for another. Let's have a lot of competition. Want to join a snappy traffic net? Get in touch with W1CJD, W1BHM or W1CTI at once for details.

Traffic: W1MK 390, W1CJD 151, W1APJ 58, W1BNP 54, W1AJB 41, W1BDI 41, W1ATW 32, W1BFS 30, W1BQS 28, W1BYW 28, W1BIH 21, W1DGG 18, W1CVL 18, W1BAX 16, W1APW 14, W1COA 14, W1BEO 13, W1DOW 12, W1BGJ 11, W1CTI 10, W1FL 9, W1CAP 9, W1BHM 8, W1CNU 8, W1BVW 8, W1ASP 7, W1BNB 7, W1BWS 5, W1UE 5, W1TD 4, W1DFT 4.

VERMONT — SCM, Roy L. Gale, W1BD — W1DHX has improved his note. W1BJP reports that W1CUN is in N. H. W1DQK is on 1.75-mc. 'phone and W1TJ is building a crystal rig. W1EIS and W1EGU are on with low power. The W1CGV ops work in relays. W1C1Y is busy with an NRI course. W1EHB is on with a pair of '45s. W1CGP is in Canaan for the summer. W1ERJ is a new ham at Windsor. Our RM, W1BNS, visited the Portland, Maine, gang. W1AVP visited the SCM. W1AZV says someone is using his call illegally. W1CGX feels much younger after having the "dead-end turns" removed. W1ATF is on quite regularly. W1BZD got a write-up in the Rutland Herald for traffic work. W1EFC wants to know where the old Vermont gang is.

Traffic: W1BNS 201, W1BZD 102, W1BD 34, W1ATF 12, W1BJP 8, W1DHX 6, W1AZV 5, W1CGX 2, W1CGV 66, W1EQU 4.

RHODE ISLAND — SCM, N. H. Miller, W1AWE — W1EOF is a new station in Providence. W1BUX worked his first "J." W1AWE spends most time experimenting. W1CAB, W1DAH and W1DBA are on 14 mc. W1BGM has a couple of schedules. W1BOY says summer has put a slump in his activity. W1CPV is a new ORS. W1ALI, EX-W8DJA, wants an ORS. W1BTP has a new super-het receiver. W1ASZ has portable W1EQF. A new station in Pawtucket is W1ELU. W1AAD just completed his new all-frequency transmitter. W1AMD is enjoying the summer at his country home. W1AFW, W1AOP, W1EBU, W1BGA, and W1AAD are on 1.75-mc. 'phone. W1DIT, W1DOT, and W1CJH are on 3500 kc. W1AMU is busy with BC work. W1BGA worked 23 foreigners in one week. W1BOS reports for the Westerly hams. W1DW has a C.C. signal on 14 mc. W1BZI-W1ZS-W1II keeps busy up in Chepachet with his O.O.-O.B.S. work. Traffic: W1CPV 27, W1ASZ 20, W1BGA 19, W1AAD 17, W1BTP 13, W1BOY 11, W1EOF 4, W1BUX 3, W1AWE 3, W1ALI 1.

NORTHWESTERN DIVISION

OREGON — SCM, Dr. Dolph L. Craig, W7ALO — W7ALM, W7AJX and W7ACH visited the SCM. W7AMF reports. W7BZS has moved to Adams. W7BKL reports for first time. W7AYV and W7ABZ are putting in crystal. W7BOO is reported to have Ylitia. W7CBA will soon have MOPA. W7WR is easing off for summer. W7AEM is rebuilding receiver. W7SY keeps A.A.R.S. schedules. W7PE reports sickness in family. W7HO says DX action. W7CCU is going to have an assistant operator. W7AYN says a message never dies in his shack. W7ZZL and W7ASG had schedules from National Guard camp. W7MY has an FB car now. W7BWD is back on the air. W7QO has moved from Portland to Coos Bay. W7AWO has a new 30-watter. W7CQK has moved to California. W7ALO is the proud owner of 2 UV861s.

Traffic: W7WR 85, W7AEM 75, W7ZZL 73, W7ACH 58, W7SY 56, W7ABZ 53, W7ASG 50, W7AYN 42, W7AYV 17, W7AHJ 15, W7AMF 12, W7CBA 11, W7BOO 11, W7ALO 4, W7BKL 3, W7BLN 2, W7APE 2, W7HD 2, W7AJX 1, W7BZS 3.

MONTANA — SCM, O. W. Viers, W7AAT — W7AHF and his kid brother keep the station going during the summer months. W7BGC reports W7CII as new station in Climdiva. W7BW is still busy with BCL sets. W7AOD has a 32 in the final stage. He reports a new Missoula station, W7CNE. Congratulations to W7CT on the arrival of a new baby boy for second op. W7FL reports that the Butte gang are enthused on a Naval unit. W7BKM worked his first DX — K6EBR. W7AYG says he's the only one of the

Forsyth gang in town, W7AST and W7AIR both having jobs now. W7AAT has a schedule with W6USA during the Olympic Games. W7ASQ reported direct to HQs at the last minute.

Traffic: W7AAT 52, W7FL 30, W7AHF 44, W7AOD 38, W7BKM 16, W7ASQ 16.

ALASKA — SCM, Richard J. Fox, K7PQ — This report received via radio from K7FF by W7BLH and mailed to HQs. K7TF reports working SU8WT on 14,000 kc. K7BND, K7FF, K7ANQ, K7ALT and K7BMY handled Father Hubbard's Expedition traffic. Traffic for the movie folks aboard the *Nanuk* moves via K7FF-K7AHI. K7TF wants traffic schedule on 7000 kc. with some of you westward stations. K7FF makes BPL. K7ANQ reports lots of red salmon. K7BND and K7BOE both find little time for ham work. K7CDV at Egegik keeps a schedule with K7BOE. K7BLI is handling traffic for the Carnegie Institute Cosmo Ray Expedition. K7BWQ at Chicago is awaiting license modification.

Traffic: K7FF 561, K7BND 165, K7PQ 129, K7BMY 96, K7TF 57, K7BLI 52, K7ANQ 31, K7AHI 30, K7BHR 29, K7AIF 28, K7CKK 24, K7CEE 24, K7BOE 7.

IDAHO — SCM, Oscar E. Johnson, W7AKZ — W7AT has again been bitten by the bug. W7KG has moved to sunny California. W7AYH and W7BAR are to do a lot of experimental work on 56 mc. W7CAX, W7CJH, W7CMQ, W7CGF and W7DD are all new hams in Idaho. W7AFT has a new job. W7BKA has new transmitter and antenna systems. W7ACO and W7AJQ have turned tourist. W7AKZ is now "farming." W7QD is pecking away. W7CLW is new ham in Sandpoint. The SCM plans to attend the convention in Yakima in September. Let's all go!

WASHINGTON — SCM, John P. Gruble, W7RT — A new high-power station, W7BLH, takes the traffic lead this month by virtue of K7 schedules. Daily schedules with K7AOA, K7UT, K6DV, OM2TG, W6USA, etc., place W7BB in a high second place. W7ADS handles A.A.R.S. traffic. W7AFC reports growing interest in the coming convention. W7BWC, of KCS, has been transferred to Indianapolis. W7BGL is seriously thinking of 1.7-mc. 'phone. W7BIW left his crystal MOPA long enough to visit W7IA. W7BCV is a brand-new OBS. W7BHH is using his portable W7CLN on Bainbridge Island. W7AYO worked ZM2C. W7BUW worked J1ER. W7CEK and W7IC are traveling. W7CLH and W7BKW are on at Kennewick. W7AIT keeps 28 weekly schedules. W7SL and W7US have a weekly schedule. W7QI, RM, and President of the Amateur Radio Club of Seattle, keeps schedules with W8DXE, KA3AA, K7OX, and W6GW. W7AVM kept in touch with his wife at Vancouver, B. C., via amateur radio. W7ANP handles traffic reliably for Yakima and Vancouver, Wash. New man at Yakima is W7CLP. W7AZI is new ORS in Tacoma. We'd like to hear W7EX, W7BVR, W7VO, and W7BQR on the air again. W7FK's new QRA is 1013 — 15th North, Seattle. W7WY, old reliable, kicks through with an excellent report. W7BUK states that Bellingham is not at all asleep on the air. W7ARQ is working on P.A.F. Boat *Catherine D.* as radio operator. A new traffic handler is W7BFT. W7BUX, Yakima, QRL convention. W7VY, using a single '10 on 14 mc., got R8 from the following: HSICK, F8PZ, VK5HG, J1EE, J1EP, J1EO! W8AGV and W7CGZ are returning from National Guard Camp. W7APR is new ORS at Spokane. W7CMO is a beginner at Tacoma. W7ABU has a new portable call, W7CNN. W7CMX was old 7QP in the "good old days." A 50-watter on 3.5 mc. does the trick at W7AIB. W7EK and W7ACY are off the air. W7AB uses tube keying relay. W7TZ visited W7BDF. W7ABU is an ORS applicant. W7DL's shack was badly damaged by fire. W7TX is still working his K7s. W7BAC is on 14 mc. W7BSX, W7APS, W7KO, and W7BTX handle traffic for Seattle. W7ATK, Kent, and W7DF, Auburn, are bound for the Olympic Games. W7BNI spent several weeks in California. W7CJS works on 3.5 and 7 mc. W7AJ has been handling considerable traffic with K7AIF. W7BG, Northwestern Director, handles a few messages on 3.5 mc. W7AJS is planning to increase power. W7BBP is active at Lyman. W7CKH is thinking of using 100 watts. W6CH in Bering Sea listens to the gang over the air. W7AHQ applied for a portable. W7AOM is Olympia's YL op. Another active YL is W7BCB, and XYL W7MM. W7AFP is using a '10 in

the final of his crystal rig. W7AIE operates in three bands. W7AVE-W7CLE has a 'phone set on 56 mc. W7AEA uses W7BHJ for portable rig at Gig Harbor. W7LD wants to be ORS. W7BVO works in four bands. W7HE and W7RB are planning convention trip to Yakima. W7CGN worked CEIAP on 14 mc. W7BYF, portable W7ZZR, is a new reporter. An old-timer, W7NR, drops us a line on activities in Everett. K7AIF plans to make the convention in time. Traffic and YLs don't mix at all, says W7RT. W7BJI is new station at Megorden's Ranch, Clearwater. W7OV is expecting big total through schedules with W6DSZ, K7CF, K7BMY, W7AWH, etc. Experimental trips with portable apparatus are being planned by W7CGN, W7BRS, W7BXF, W7RT, and others. Portable calls to be used are W7CEN, W7CCZ, and W7ZZH. If you are not mentioned in the section reports, it is because we don't hear from you. The reporting date is the 16th, and should contain traffic and news for the preceding month. Washington set the 1932 "high record" for the gain in number of traffic reports. (See March QST, 1932.) What say we do some more record-breaking, fellows? See you all at Yakima Convention, September 3rd-4th, 73.

Traffic: W7BLH 1116, W7BB 616, W7BSX 312, W7AYO 302, W7AIT 208, W7WY 199, W7TX 112, W7DL 92, W7QI 85, W7BUW 48, W7ANP 40, W7AJ 39, W7SL 34, W7AIB 34, W7NR 29, W7BUX 25, W7BCV 24, W7AJS 20, W7ABU 19, W7CGN 16, W7AYM 15, W7LD 15, W7APR 14, W7BUK 13, W7KO 13, W7APS 11, W7FK 11, W7AHQ 10, W7AFC 10, W7AFP 10, W7CCF 9, W7BTX 9, W7IC 8, W7ADS 7, W7BAC 6, W7NO 6, W7BYA 6, W7AIE 6, W7BFT 5, W7BG 3, W7BNI 3, W7BVO 2, W7RT 2, W7CJS 1.

PACIFIC DIVISION

SANTA CLARA VALLEY — SCM, Bruce Stone, W6AMM — W6HM and W6AMM either sent or received every message over 7200 miles of Pacific Ocean to P.I. W6AMM is re-arranging schedules to try to get a little sleep. W6DSZ turned in an FB report. W6ACV carries an Alaskan schedule and beats the mail by three months into a remote part of snow and ice-bound territory. W6CEO has a daily schedule with KA1CO. W6DNY reports little traffic on the 1.75-mc. 'phone band. W6FMT and W6DHV are sister and OW of W6DSE and W6FBW respectively, and are real operators. W6DHV is the Secretary of the Santa Clara County Amateur Radio Association. W6DSE is QRL with summer work. W6BMW has parts coming for new outfit. W6FBW is building an Electron Coupled Frequency Meter. W6NX is QRL Naval Reserve work. W6DCP, W6ALW, W6DBB and W6EEL reported.

Traffic: W6AMM 401, W6HM 148, W6DSZ 90, W6ACV 64, W6CEO 37, W6DNY 11, W6FMT 9, W6DHV 7.

NEVADA — SCM, Keston L. Ramsey, W6EAD — W6FKY is moving. W6AJP is busy with U.S.N.R. and A.A.R.S. W6UO visited the Reno gang. W9DFF is in our midst awaiting a W6 call. W6FMS is installing an '04A. W6AAX bought a crystal. W6EEF has an FB MOPA. W6BYR is on 'phone. W6FUO is going in for higher power. W6CRF is giving up radio for a few months. W6ATN is working some fine DX on 'phone. W6EAD is building a new frequency meter.

Traffic: W6AJP 31, W6UO 8, W6EAD 10.

EAST BAY — SCM, S. C. Houston, W6ZM — Alameda County: CRM Ken Ross, W6ATJ. W6AF leads the Section this month with the highest total in his history. W6WX turns in fine report. W6CDA is now connected with WLV and OM2TG. W6RJ handled traffic for the Cocos Island Treasure Expedition. W6ATJ was away on a vacation. W6ZM handled a few between spasms on his new crystal rig. W6BIS is a new ORS. W6BKM is now on 14 mc. W6CDP says that W6EK (YL) was a visitor recently. W6FQE has a new transmitter and receiver. W6DWI has been experimenting. W6DKJ and W6CSV says that I put them in Contra Costa County last month. Sorry. Contra Costa County: W6EJA says his total is unlucky. W6AAT says power leak is awful. Napa County: RM, J. Clausen, Jr., W6AUT — W6BYS is on 7 mc. W6CZN has his new receiver going FB. W6FII is handling lots of traffic. W6AUT is having trouble with his crystal rig. Ex-W6CUM has just received his operator's license. W6EDO is QRL garage work. Solano

County: W6BPC has a 250-watt bottle in the final stage. I would like to see every station turn in a report of what traffic he handles, whether he is an A.R.R.L. member or not. Let's put the old EB Section up at the top, where it belongs.

Traffic: W6AF 630, W6CDA 156, W6RJ 115, W6ATJ 87, W6ZM 93, W6BIS 81, W6FII 68, W6BKM 32, W6CDP 20, W6DUB 25, W6FQE 16, W6EJA 13, W6CSV 4, W6AUT 2, W6DKJ 2, W6DWI 7, W6WX 291.

ARIZONA — SCM, Ernest Mendoza, W6BJF — The Arizona Short Wave Radio Club, at its annual reelection of officers, installed W6BLP for President, W6CDU-ALU for Vice-President, W6BRI for Secretary, and W6GJC for Treasurer. W6CQF aggregated 166,823 miles on his 20 best DX contacts on the recent DX contest. W6EFC and W6DIE have temporarily combined their stations. W6CDU-ALU will resume KA1HR schedule September 15th. W6DOW deserted 14 mc. for the tall pines of Prescott. W6CVW is new ORS. W6CAP and W6CVR furnished radio facilities to a Boy Scout Camp they attended. W6CVR made a visit to Phoenix. W6COI-W6CFG is moving to Douglas. W6GJC has his MOPA almost ready. W6CEC is rebuilding into a rack and panel job. W6BJF is building portable W6CLE, for use at National Guard encampment in Flagstaff in August. W5ZZB seems to be well pleased with our section of the country, else why the new call, W6ZZBC? W6FKX is now a piccolo player in the National Guard Band. W6DSQ is preparing himself in order to exchange his green ticket for a yellow "extra first." W6GGS now has a green ticket. The SCM and W6FKX drove out to Prescott and looked up W6EL, W6UG, and Earl Schuler. W6EL took in the ham picnic at Hemet, Calif., July 4th. W6UG has just finished his work at the U. of A. W6DNP is building an "ac knodyne." W6EAW is using a power supply from storage battery. W6FGG is vacationing on the coast. W6EEN expects to return to Ajo this fall, from Shreveport, La. W6DRI changed to 14 mc. W6EJQ is working on a chicken ranch in Douglas. W6EEJ is in Hawthorne, Calif. W6EJN, according to W6BEP, will soon be active again. W6CBA gave away all of his stuff to W6EEN and W6EEJ. W6CKW was elected chairman of the executive committee for the Safford Convention of the American Legion. W6BEP received a "hear" card on his 3.5-mc. 'phone (R9!) from J2CH. W6GGG is the call of Mrs. W6EL. W6FZQ is QRL "YL." W6BYD as a service man is a good gold miner! W6FAI is rebuilding on a low two-shelf bench. W6DKU makes his own wood-turning lathe. W6GFK caught the radio bug while helping out W6DPS, who was recovering from bad motorcycle crackup! W6BVN is still waiting for her OM to allow her a little corner of W6CEC-W6BCC's shack to call her own!

Traffic: W6CQF 431, W6EFC-DIE 70, W6CDU 62, W6DOW 28, W6CVW 13, W6CAP 13, W6CVR 5, W6COI 4, W6GJC 2, W6CEC 2.

SAN FRANCISCO — SCM, C. F. Bane, W6WB — We equalled the "all time" high in number of men reporting (20). Dropped a notch or two in traffic, but watch us next month! W6PQ says his, and one other Army Net, are the only ones running this summer. Yep, BPL again, our star performer as usual. W6EKC has a "beeg, beeg" total and a new ORS. More dope, please. W6NK is third in line in spite of the "vacation season." W6EYN is now settled in his new QRA and is starting to step along with the ole traffic. Nice work, OB. W6CIS is skedding K7AKV, also skedding week-ends to Yosemite. Nice? W6SG (ex-KALAW) can be heard nightly on 7 and 14 mc. Old friends, take notice. W6DZZ, after a wild debauch with the Europeans on 14 mc., is doing business at the old stand, 7 mc. He is now WAC. Congrats! W6MV had a great time in L.A. with portable W6GMV. Says DX much better down there than in S.F. Now skedding W6USA from home. W6OS and W6WB called on the newlyweds, W6WN and exYL, and ate up all their food. Hi! The W6OS super is improving daily. W6CAL is still wondering why he didn't hear any Europeans. We know! Hi. W6CBN says his report last time didn't get in QST. He is rebuilding, but found time to handle some traffic. W6DQH-AAM is firmly settled in S.F. now and expects to handle some real traffic. W6FBU reports in via 'phone. Mighty glad to have you with us OB. Come again. W6WF is still trying to collect dues for A.R.A. Don't look at me, Jack. Hi. Reports his traffic also. W6IU sends in re-

port before leaving for vacation. Worked Europe on 14 mc. W6CZK also up among the tall pines, but says big things will happen on his return. Fine, Hank. W6KJ tells us how good the — ah — water was up in Vancouver, B. C. That's mean, Russ. W6BNA is home after a good trip and says his skids are commencing to perk. Power leak seems to be the bane of W6BVL. They're the bane of Bane, too, OB. Ouch! W6FPE worked himself some Europeans and is a happy man. W6WB, — oh what's the use? Hi. Start saving your shekels for the Long Beach A.R.R.L. Convention, September 3rd and 4th.

Traffic: W6PQ 634, W6EKC 261, W6NK 118, W6EYN 77, W6CIS 71, W6DZZ 52, W6MV 47, W6OS 40, W6CAL 31, W6CBN 20, W6DQH 15, W6FBU 18, W6WF 12, W6IU 8, W6CZK 8, W6KJ 6, W6BNA 5, W6BVL 4, W6FPE 3, W6WB 3.

PHILIPPINES — Acting SCM, Newton E. Thompson, KA1XA — KA1SL sailed for U. S. July 16th. He expects to return in six months. KA1XA is Acting SCM. OM1TB shut down July 14th. OM2TG handles all traffic for Guam. KA3AA sails for States via Europe July 27th. KA1NA is now on with 50-watter. KA1LG is testing with 250-watter. KA1LY will soon have 250-watter on the air. KA1WR, KA1EL and KA1SP now have DC signals.

Traffic: KA1HR 979, OM1TB 644, OM2TG 342, KA1LG 184, KA1SL 128, KA1CO 114, KA1NA 103.

LOS ANGELES — SCM, Hal. E. Nahmens, W6HT — Hot diggity! Bigger'n better every month! 173 reports in all! 132 report traffic, breaking through Michigan's record of 110! 23 brand-new traffic reporters! Every ham reporting traffic receives a copy of the section paper, the *Dope Sheet*.

On to our goal of 200 reporters! TEN stations make the BPL: W6USA, W6ETL, W6DQ, W6NF, W6DER, W6BZZ, W6EKZ, W6BZF, W6ADH, and W6YAU! Los Angeles County: W6USA takes the center of the stage working daily schedules with 12 countries in 5 continents! W6ETL is near the top as usual with W6DQ closely following. Traffic for KTUT, MGM location in Alaska, can be routed through W6DQ. This was W6DER's biggest month. W6ERC operated portable W6BZZ at Camp Tulakes, Boy Scout camp. W6EKZ and W6ADH, new ORS, make the BPL on deliveries.

The delivery net is responsible for the fine totals at W6BPU, W6EBK and W6BLS. W6DEP took first traffic from KTUT. W6FRB has some FB Hawaiian schedules. W6AGU of spark days is now signing W6AHQ. W6COF is putting crystal-controlled 'phone rig on 1.75 mc. W6CCF voices Section's thanks to RM W6BPU and members of the delivery net for their splendid cooperation. W6BYD operates W6ALD, new U.S.N.R. net control station, at Municipal Airport in Long Beach. W6AKW is on 3.5- and 7-mc. bands with new crystal rig. W6ETM reports the 6th District A.A.R.S. now has 13 members. W6EUV has good total. W6TE clocked 72 in his whoopee without half trying! W6EV is in line for ORS. W6BEE, W6EDW and W6BGN have 50-mc. rigs working in San Pedro and desire QSO with L.B. or L.A. W6FGT is getting out with 180 volts on just crystal oscillator! W6LM is taking portable on his vacation north and east. Beginners interested in learning code, drop a card to W6CTT. W6EAA has installed '51 tube in TPTG. W6DWP is organizing 7-mc. net to tie in with 3.5-mc. net. W6AFU has shifted his OB schedule to 7250 kc. W6ETJ and W6CUH are living at Olympic Village and handling bulk of W6USA traffic. W6EQW spent vacation in Yosemite. W6ATV changed from push-pull to parallel final. W6ANN is garnering traffic at his new radio shop in "Goosetown." W6BXH is pushing traffic with an '01A. Pair of '60s now grace final stage at W6HT. W6BGF is spending summer on beach. W6EXQ made WAC in three days. W6DKT admits a midnite schedule with W6DHV — a YL! W6VH is working hard on the Big Convention. W6DLI moved into new shack. W6EHO got card from Sweden. W6EYJ is aching for a QSO on 28 mc. W6FJA, W7FVW, W6DQT, W6ETI and W6DSP are on 1.75 'phone. W6CII and W6AAN are handling shifts at W6USA. W6CXW made WAC in a month at new QRA in Long Beach. W6CNH, another old-timer, is back on air. W6AM will speak at the Pacific Division Convention, September 3rd and 4th, at Long Beach. W6BCK traded his '52 for a '60. W6WO has a TPTG '52 on 14 mc. W6EVE received his unlimited 'phone ticket. W6CGP is installing crystal. W6DQI

is building rig with '61 final. W6FJT claims someone is using the Glendale J. C. call, W6YBC. A Biley 7004-ke. tourmaline crystal is being installed in W6ZZA. W6MA claims an airplane flew through her antenna and broke it. W6VO is covered by W6USA blanket. W6FYA wound 6600-volt



W6EYE

transformer for his '52. W2AES is giving the local boys a thrill with his portable W2ZCG. W6AGF changed shift at airport. W6BHP QSOed his first VK and LU on 14 mc. Someone having a knack for tracing power leaks should go to assistance of W6BVZ. W6FJS enjoys the *Dope Sheet*. W6BHT has moved to Newport, Ky. W6DWP says he's going to attend the Ham Convention in Long Beach if it takes a leg and all the RF in his tank coil. Hi! W6FVU is new ham in Reseda. W6RZ is experimenting on 28 mc. W6ACL is going to sea on a tuna boat. W6ESA hopes to be back on the air soon. W6CU, a real died-in-the-wool, has returned to his first love. W6BP can't operate with commercial ticket, and hasn't opportunity to take ham exam, so is off indefinitely. Listen for W6DPB's high-power 56 mc. rig at 7 p.m. nightly. New reporters: W6BXH, W6FYA, W2ZCG, W6FJP, W6GJA, W6CNH, W6FBR, W6ATV, W6ALD, W6CQO, W6EOG, W6FJA and W6FMP. Welcome, OMs! The A.R.R.C. now meets at Gibson's Cafe (2nd floor), 1800 S. Main St., Los Angeles. Santa Barbara County: Real activity here! W6BZF makes the BPL on deliveries. Navy traffic helped total at W6YAU. W6EZK tried to visit W6USA, but couldn't crash the gate. Hi! W6GEFQ and W6GFZ are the only hams at Lompoc. W6FYC is new ham in Santa Maria. W6EDZ is Route Manager for SBARC. W6AIY is U.S.N.R. net control station. W6AWY furnishes dope on rest of gang. W6EMY applies for ORS. W6DJS, SBARC President, is anxiously awaiting arrival of club station license. W6ENJ is using his portable, W6GDH. W6CNO is working lots of DX. W6CPS got a job. W6ASK grinds out talkies at local theatre. W6FYF, ex-W6BMB of Long Beach, has commercial-looking crystal job. W6FFF says he'll miss the 1 kw. reports on foreign QSLs now that the bird who snaffled his call has given it up and taken up another. Hi! The SBARC has organized an excellent net for city deliveries. New reporters: W6LC, W6EWC, W6AKC, W6FNK, W6AIY and W6BFM. San Bernardino County: Up a notch this month! W6DZC is high man. W6FTV is going to Convention! W6FNG reports via delivery net. W5AHL-ZZT, ex-SCM of New Mexico, is using portable W6BMC in Upland. W6CUJ is awaiting change of address papers. W6CVV's schedule with National Guard fell through. W6FYT says his YL op was born same day he got his license and during local radio club meeting, so she just can't miss. Hi! W6DGL reports swell time at Ham's picnic at Idyllwild over July 4th. New reporters: W6BMC and W6ERM. Riverside County: W6NF-CFN leads county as usual. W6DLV had to whittle the edges off his crystal to make it work. W6DZF reports for first time in many moons. W6EFY is seeking cooler clime for the summer. W6DTU

is new ham in Riverside. Ventura County: W6DCJ is on the delivery net. W6FET is a new reporter. W6EYE is W6DCJ's sister and a school-teacher. (Note the photo with this report!) W6DJZ is experimenting with break-in 'phone a-la W9CJU. San Luis Obispo County: W6ALQ is traveling around the country in newly acquired whoopee. W6FNP didn't report before because he thought only A.R.R.L. members were eligible. EVERY ham is urged to report even if only ONE message is handled per month! W6DWW says the town is full of National Guard hams. See you at the big Convention! September 3rd and 4th, Breakers Hotel, Long Beach, Calif. I DON'T MISS IT!

Traffic: W6USA 1607, W6ETL 531, W6DQ 422, W6NF 414, W6DER 362, W6BZZ 333, W6EKZ 302, W6BZF 254, W6BPU 235, W6ADH 217, W6EBK 215, W6YAU 199, W6BLS 113, W6EZK 105, W6EDZ 90, W6DEP 83, W6FRB 83, W6AHQ 82, W6AVJ 80, W6COF 80, W6AWY 77, W6CCF 77, W6DH 76, W6ALD 68, W6AKW 60, W6EZN 57, W6AIY 54, W6EMY 54, W6BYD 52, W6ETM 48, W6DZC 46, W6EUV 42, W6TE 41, W6EV 41, W6EDW 34, W6BEE 32, W6FTV 30, W6FGT 29, W6LM 27, W6FJP 26, W6FNG 26, W6CTT 23, W6DJS 22, W6EEA 21, W6DWP 21, W6CZT 20, W6FNK 20, W6AFU 20, W6CZZ 18, W6ETJ 17, W6LY 17, W6EQW 17, W6BMC 16, W6CUJ 16, W6ATV 16, W6AKC 15, W6DLV 14, W6CVV 12, W6ANN 12, W6EGJ 11, W6LC 11, W6CVZ 11, W6BXH 11, W6HT 11, W6BIK 10, W6ALQ 10, W6BGF 10, W6EXQ 10, W6FYT 9, W6DZF 8, W6FVW 8, W6DGL 8, W6DKT 7, W6ENJ 7, W6DYQ 7, W6DLI 7, W6VH 7, W6AIF 6, W6EHO 6, W6TN 6, W6CNO 6, W6EYJ 6, W6EOG 6, W6FMP 6, W6FJA 6, W6CII 5, E6CUH 5, W6DSP 5, W6FXL 4, W6CXW 5, W6AYL 5, W6CNH 5, W6EWC 5, W6AM 5, W6BME 4, W6BFM 4, W6FNP 4, W6BCK 4, W6EFY 4, W6WO 4, W6EVE 4, W6ERL 3, W6CGP 3, W6DQI 3, W6FGQ 3, W6AAN 3, W6FJT 3, W6EIV 3, W6GAL 2, W6ZZA 2, W6MA 2, W6VO 2, W6AIX 2, W6AYF 2, W6FYA 2, W6ZZC 2, W6FET 2, W6FEW 2, W6AGF 2, W6BOB 2, W6BHP 2, W6ERM 1, W6DKM 1, W6CVF 1, W6CQO 1, W6FBR 1, W6BER 1, W6BVZ 1, W6GJA 1, W6DCJ 1, W6AKD 1, W6FJS 1.

SAN JOAQUIN VALLEY — SCM, E. J. Beall, W6BVY — W6SF was the only report received from the Stockton gang. W6ASV is being operated by three ops. W6GFR is president of the Tulare High School Radio Club. W6EUQ is up at WPDA. W6YBK is assigned to the Tulare High School transmitter. W6EMI will be on again soon. W6BIL has trouble getting 8s or 9s. W6EPQ claims WAC. W6BQC received his all-district call, W6ZZAZ. W6DQR is having fun building antennas. W6BIP schedules BX, a schooner QRD south seas. W6DQV is the old reliable for schedules. W6CLP uses 14,200 kc. exclusively. W6AME hunts up hams wherever he goes. W6GCL and W6GJS are new hams near Modesto. W6AOA, the RM, reports. W6CGM is all set for business. W6YE-AHO has been in the mountains. W6BVY maintains schedules with NDH-W6NK, W6DQV and W6AME.

Traffic: W6SF 30, W6EPQ 41, W6BQC 21, W6DQR 14, W6BUZ 26, W6BIP 69, W6DQV 35, W6AOA 66, W6BVY 33.

SAN DIEGO — SCM, H. A. Ambler, W6EOP — W6CNB tops the list. W6UA (ex-W6ADC) is home from college. W6FQU has early morning schedule with El Paso. W6BKZ has a new phone on 3.9 mc. W6ACJ is back with us. W6EPF, our RM, is changing QTH. W6BAM received a heard card from Wales. W6AXN has been trying for a contact with Europe for WAC. W6CNQ is building a new transmitter. W6EES has gone to CMT. W6EAB got a card from a ZL. W6BOW and W6EOP have been on 56 mc. W6BOW is looking for San Diego traffic. W6AMO has worked 16 countries and 4 continents. W6AKY put up a new antenna. W6CTP is now WAC. W6BCF is building a new c.c. transmitter. W6AKY was sick in bed for two weeks. W6CTR has a new 56-mc. receiver. W6DNL is away with the fleet. W6DNW has a new receiver. W6QA is getting things lined up in the Valley. W6EPZ listens in to hams aboard the U.S.S. California.

Traffic: W6CNB 233, W6UA 27, W6FQU 23, W6BKZ 16, W6ACJ 6, W6BAM 7, W6AXN 6, W6CNQ 5, W6BOW 4, W6EOP 4, W6AMO 3, W6CTP 1.

SACRAMENTO VALLEY — SCM, Paul S. Farrelle,

W6AXM — W6AIM leads the Section in traffic. W6EJM is operating aeronautical radio station for the United Air Lines. W6DKW is new prexy of local radio club. W6CMA is giving 1.75 mc. a try. W6AID and W6ELC are spending the summer at Lake Tahoe. W6BLX is seen at the airport at 5:00 a.m. daily. Hi. W6BYB is trying to make his latest transmitter work. W6AXT is another local amateur to try 1.75 mc. W6EOU is using low power. W6EOC will be back on with his crystal-controlled 'phone. W6BBW was on U.S.N.R. cruise. W6DVE is coming right along with his traffic. W6AK has his '04A c.c. on 3.5 mc. W6FPH is QRL grocery store. W6CGM has a transmitter that won't work. W6AXM has been taking flying lessons.

Traffic: W6AIM 409, W6DVE 38, W6AK 17, W6CTH 67, W6CMA 30, W6AXM 12.

ROANOKE DIVISION

WEST VIRGINIA — SCM, C. S. Hoffman, Jr., W5HD. W8NS — W8DPO won crystal prize in contest given by Ohio Valley Amateur Radio Club for having most QSOs over a two-week period. He had 250 QSOs. W8BHG is editor of the scandal sheet published by the O.V.A.R.C. W8BG leads state in traffic. W8CAY, W8ELO and W8CSR were on active U.S.N.R. duty at NAM. W3NR visited W8BHG, W8BWK and the SCM. W8GB visited W8ML, W8BKG, W8EKK, W8BTB and W8FFO are installing crystal rigs. W8ZZAF is working in Randolph County at Boy Scout camp, using 135 volts of B bats. on a Type '01A, on 3.5 mc. W8ZZAN has schedule with W8HEI. W8HEI has one of the new radio-telegraph operators' licenses. W8BOW was on vacation. W8EL's antenna blew down during storm. The SCM was pleased to QSO during the month W8EIK and W8SKE on a three-way contact, also W8JM and W8CVK from W8DNCX.

Traffic: W8BG 123, W8DPO 16, W8EIK 17, W8BOW 16, W8HD 15, W8JM 12, W8GEG 56, W8ZZAF 38, W8BGF 28, W8BHG 2, W8CSF 9, W8BWK 4, W8BKG 2, W8EKK 2.

VIRGINIA — SCM, R. N. Eubank, W3AAJ — Chief Rte. Mgr. C. E. Hedrick, W3WO. W3CKM sends first traffic report. W3GY is rebuilding. W3ACN is doing fine work with U.S.N.R. W3BSB reports regularly. W3BXP is using crystal. W3AGY is QRL YLS and trips. W3BRY will be back actively soon. W3AGH is operating WTEF, U.S.C. and Geodetic Survey, Boston, Mass. W3AVR is QRL. W3AZU is forming club in Northern Va. W3FE has new antenna. W3BCI has new 4-tube receiver. W3CLX reports for first time. W3BZ is working on 56 mc. W3BPR gets plenty delivery on his traffic. W3BZE is on 7 mc. every day. W3AKN was heard by WTEF. W3BRAN is sure one fine O.O. W3BEK has FB 14-mc. 'phone. W3AVU is operating at Scout camp in Chesterfield Co. W3CAH is QRL night flying. W3AUG is now commissioned in Naval Reserve. W3BAI is on 56 mc. W3AAJ is rebuilding. W3BFQ is building crystal. W3GE's shack is now moved. W3BZD, W3BXP, W3BYQ, W3CLX and W3CMJ are new stations. W3ZU, W3CGR, W3BKJ and W3BFS joined U.S.N.R. Norfolk now has the First "MYSTERY RADIO CLUB." W3CKZ is planning new rig. W3AHK is building "swell" c.c. job. W3AKZ and W3BDZ reorganized the Roanoke Club. W3BFS has low power rig. W3AOT is doing nice job with Petersburg Radio Club. W3ADJ took out some doublers. W3CFL is on 7 mc. W3CDQ and her two sisters visited Richmond July 16th-17th. W3BNH is putting in FB high power rig. W3CGR is interested in 56 mc. W3BSM is with us 100%. W3VJ visited W3GE and Richmond. W3BWT spent part of vacation in Va. W3CDW reports traffic for first time. W3BXN is rebuilding c.c. for '03A. W3YD, W3WLF, was transferred to Haiti. W3BJX has new SW3. W3WO has applied for commission in Naval Reserve. W3AMB is at W3AVU, Scout camp. W3CPN wants a foreign schedule. W3CEY is building MOPA. W3CCK is building 50-watt c.c. P.P. W3CIE is building a P.P. job. W3BBE is awaiting power supply. W3WM blew tubes. W3BRY is "STAR" QSL Card man. W3BFQ and OW, 3GE and OW, 3BCI, 3AAJ and OW, 3CDQ and Marie and Rose Zandonisi, 3BKJ, 3CFL, 3BFS and OW, 3CGR and OW, Elsie Ford, Boiesseaux and OW, Winfree, English and OW, Lieut. Bolling and wife, and crew took trip down river, Sunday, July 17th, as guests of Naval Reserve. W3AKN has schedule with W4AVT. Lieut. Mathewson, W3FJ, is organizing the Army

Amateur Net in Virginia for fall. Any Virginia station interested in joining, QSO or write W3FJ. Report each month on the 16th to the SCM for listing in these reports. The Radio Inspector will visit Richmond first part of September for station inspection and holding exams. Write Norfolk, if you will take exam.

Traffic: W3FJ 109, W3AKN 50, W3BAI 30, W3AVU 32, W3BJX 30, W3CLX 23, W3FE 28, W3CKM 29, W3AGH 16, W3BXP 12, W3BSB 12, W3AAJ 7, W3BPR 6, W3BMN 6, W3CDW 5, W3AVR 5, W3BEK 4, W3BXN 3, W3BAN 3, W3CAH 3, W3AZU 1, W3GE 1, W3CFL 1, W3CEY 14, W3CCK 4, W3ADJ 24.

NORTH CAROLINA — SCM, H. L. Caveness, W4DW — The SCM moved to 2303 Clark Avenue. W4RX recently sold his receiver. A blown-up power supply kept W4IF off the air. W4AGF and W4EG are rebuilding. W4AVT has been out of town quite a bit. W4ADK spends 50% of his time trying to collect traffic and the remainder rag-chewing. W4ATS recently worked Asia! W4TO, W4TH, W4TW, W4HX, W4AL, and W4AWZ went to Atlanta for 'phone examination. W4TO has had a bunch of visitors this summer. W4TP has moved into his new shack. The weather got too hot for W4GZ to stay in his shack. W4TR has built a four-stage speech amplifier and modulator for his 'phone. W4ABW and W4AWP have been experimenting with 56 mc. W4AAE reports the summer lay-off in full swing at his shack. W4AOE has closed down until the opening of school in September. W4AEH has some schedules for handling traffic from a Boy Scout camp. W4ZH slips in some fine DX on 14 mc. W4RE has been making some tests with NAO. W4MR worked eleven out of twelve Europeans called this month. The Winston-Salem Club members are at work on their new clubhouse. W4PA, W4AHF, and W4RA are on 7 mc. W4ABT is building a 250-watt, 3.5-mc. outfit. W4IY is on with his new crystal rig. W4BPU, W4BIU, and W4BJZ are doing good work on 7 mc. W4OG says the Winston-Salem gang are talking of having a hamfest in the early fall. W4BIP visited the SCM this month. Hall's, Inc., Harrisburg, Pa., recently donated to the State College Radio Club \$25 worth of equipment.

Traffic: W4GZ 41, W4ZH 33, W4AVT 19, W4AGF 10, W4AOE 10, W4ABT 10, W4DW 10, W4OG 8, W4TO 8, W4ITS 7, W4RX 4, W4TR 4, W4ADK 4, W4ABW 3, W4RA 3, W4IF 2, W4TP 2.

ROCKY MOUNTAIN DIVISION

COLORADO — Acting SCM, Artie Davis, W9BJN — Our SCM, E. C. Stockman, is improving, although he will be at the Fitzsimmons Hospital for a couple months yet. The Colorado Radio Experimenters Association will hold a Hamfest at the Shirley Savoy Hotel the 27th of August. Loveland: W9CKO reports for northern Colorado gang. W9IFD has a new power supply. W9JFD is using an insulated mast. W9FYL, W9FQK and W9FQJ paid Loveland a visit. W9KBO is a new ham in town. Greeley: W9EDM is on. W9BOO has portable W9JTL. W9FQK-W9HPR has a new a.c. receiver. W9FQJ will soon be on with a new rig. W9GLP lost his tag. W9FQJ-W9YAA will have an article in QST soon. Boulder: W9BYE paid a visit to W9FYY. W9JRV is a new ham in town. W9HIR is on new 'phone bands. W9FYL-W9IUH is building a new transmitter. W9JFQ will soon be on for first time. Grand Junction: W9GMC applies for ORS. Woodman: W9JNV applies for ORS. W9JCQ reports that the Colorado Springs gang had a real picnic. W9APZ reports W9RR from K.C., Mo., was in to see him. W9DQD rebuilt his transmitter. W9GNK went to L.A. to board the U.S.S. *Oklahoma* for 15 days. W9CLX, Burlington, wants to hear from the R.M. Our Director, W9AAB, is building a real portable using '47 tubes throughout; call is W9ZZX. W9KV will soon be on 14 mc. W9ZE, the Radio Inspector, has a 56-mc. transmitter going. W9RR from K.C., Mo., paid the Denver gang a visit. W9GUW has located at Colorado Springs, has a portable, W9ZZP. W9BTO is selling out his high power outfit. W9BQO is building a low power outfit. W9BCW is busy at KOA. W9FRP is QRL at Police Radio station. W9BXQ is trying out new antennas for the Police Radio transmitter. W9CJJ worked a Japanese station on 'phone. W9AUJ will be off air for awhile. W9WO is back home from school. W9FRP is going strong on 'phone. W9BYI built a crystal rig. W9RJ

got his foot smashed when a horse fell with him. W9IAV is on 7 mc. W9FCK and W9HPY are gold mining. W9CBU has 211E Push-211D Pull, and how! W9JU is active on 7 mc. W9FYY built up a crystal transmitter. W9BYC tested with him. W9EKQ is not on much. W9EPC is QRM'd by junior op. W9CND will have a pair of '52s going soon. W9EAM has moved back to his old QRA. W9JB is QRL work.

Traffic: W9JNV 414, W9JCQ 3, W9CDE 2, W9GCM 1, W9GNK 56, W9AUJ 6, W9BJN 5, W9CLX 15, W9IAV 1. **UTAH-WYOMING** — SCM, C. R. Miller, W6DPJ-W6ZZZ — W6CNX has his two '52s crystal controlled at last. W6APM and W6DPJ are working on 56-mc. outfits. Traffic is picking up at W6EXL. W6ZZAG, portable of W6BTX, reports by radio from California. W7ADF has changed location. W7AMU says 3500-ke. band is FB for rag chews. W7CJR is new station in Casper. W7NY blew his filter again! W7ACQ has been in Colorado. W7BXS went visiting W9s. W7CHR has lots of receiver trouble. W6GBO has been on the air since May 30th. W6BSE enjoyed FB vacation in Southern California. W6DPO rebuilt. W6EEM and W6FRN are new stations in Salt Lake City. W6AHD has a new National SW5.

Traffic: W6CNX 81, W6DPJ 69, W6EXL 42, W6APM 14, W6BTX-ZZAG 8, W6BSE 6, W6ADF 6, W6ZZZ 5, W7AMU 4, W6DPO 4, W6FRN 1.

SOUTHEASTERN DIVISION

WESTERN FLORIDA — SCM, Eddie Collins, W4MS-W4ZZP — Route Manager, S. M. Douglas, W4ACB-W4PCN. This month we report two new stations, W4BIV of Milton and W4BPG of Perry. W4BNE is after traffic. W4BGA is all set at new QRA. W4AUW reports a QSO with OA4J. W4AUV has a new MOPA. W4SAG is rather silent. W4BKD is struggling along. W4BOW reports his first QSO. W4AGS-W4PCK has ordered a crystal. W4AGW visited the Pensacola stations. W4AUP spent his vacation with W4KB. W4ACB-W4PCN went to South Fla. for his vacation. W4QR-W4PEL has a crystal perking on 3550 kc. W4SC continues to keep F.N.G. schedule without a break. W4AUA says summer holding up his U.S.N.R. work. W8BGX has returned to Ohio. W4BCB has a real 1932 signal. W4BMJ uses spark coils in his plate supply. W4BWL is rigging up some spark coils. W4ML keeps daily schedule with W4KB. W4AFT spends hours hunting DX. W4AQY-W4PDS helped W4BMJ in getting on the air. W4AXP reports 5 daily schedules. W4A00 is heard on 1750 kc. W4BJF is trying to get out of town. Hi. W4UW-W5NO has been relief op. at WCOA. W4MX and W4SZ have station licenses but no op. licenses. W4QU has a motor boat. W4QK's interest seems to lag. W4BGB-W4ART has changed QTH. W4UW has a new blue ticket. W4AWJ is rather quiet. W4ARV is busy on 3500 kc. W4HQ-W4PBW-NDD is planning on installing transmitter on a fishing smack for U.S.N.R. cruises. W5AGX has been in Pensacola for R.O.T.C. training. W4ALJ-W4CV-W4ZZAE has been busy with CMT work. W4BEW says all he needs is a tube. W4BKQ was heard on the air. W4BFD has been working on a new P-P rig. W4KB has been in the hospital for an operation. W4VR finds it too hot to work his station. W4ASV-W4ZZW is back on the air. W4QG has been back in Pensacola. W4OE is busy at WCOA. Several Pensacola hams visited W4OA in Mobile. W4ATF was a visitor to Pensacola. W4BIV has to operate his station from batteries. W4MS-W4ZZP has his station going FB now. Mrs. W4MS gets some very polite QSOs. Hi.

Traffic: W4KB 25, W4AGS 14, W4ASV 15, W4BGA 10, W4AUW 11, W4AUV 6, W4AQY 9, W4ACB 7, W4QR 15, W4AXP 14, W4BFD 3, W4BNE 17, W4MS 18, W4ARV 1, W4UW 8, W4QU 1, W4SC 6, W4AUA 3, W4BCB 2, W4ZZP 4.

GEORGIA-SOUTH CAROLINA-CUBA-ISLE OF PINES-PORTO RICO-VIRGIN ISLANDS — SCM, Chas. W. Davis, W4PM — W4BO is leading this month. W4AZT of Spartanburg says plenty new hams his way. W4BOY, W4BHM there; W4BCT at Moores, S. C., and W4BAY and W4BDT in Lyman, S. C. CM8AZ sold his 14-mc. 'phone rig to new local. W4WB wants ORS, RM and Trunk Line appointments. W4AAY says off for license renewal and is now operating his portable call, W4PBT. W4SS says, "Hot wx

and extra work." The SCM is still trying to get a crystal set on. W4MA says ND. W4BW says his sky wire is down. W4BGE, W4KU, W4MO, W4BEY, W4MV, W4ANV, and lots more 'phones are on the air in Atlanta.

Traffic: W4BO 49, W4AZT 27, CM8AZ 16, W4WB 12, W4AAY 5.

ALABAMA — SCM, L. D. Elwell, W4KP — The Birmingham hams hit the high mark with a transmitter located at the Registration Headquarters of the Elks National Convention. Much traffic was handled. W4AJP loaned his 100-watt c.c. transmitter and W4ASW furnished an REL receiver. W4BBA, W4ARR, W4ADL, W4DD, W4BMU and several others helped at the convention. W4KP blew his receiver plate supply just before a schedule with W1MK. W4AJC is perking to ZL, etc. W4BGO has applied for ORS. W4ADJ complains of the heat. W4BAI is QRL on the new receiver. W4AYK is headed for Auburn this fall. W4ALA is in the traffic game now. W4AGI has a schedule with ZL3AJ. W4AHU works more South American DX. W4BEP comes out with some traffic. W4AWQ says his REL won't oscillate. W4APU has gone out of town. W4PAL, W4VV and some of the others relayed traffic from the convention.

Traffic: W4KP 76, W4ARR 62, W4ALA 23, W4PAI 21, W4DD 16, W4ASW 12, W4BEP 12, W4BGO 10, W4AGI 11, W4AJC 6, W4BBA 5, W4ADJ 2.

EASTERN FLORIDA — SCM, Ray Atkinson, W4NN — W4AJX received first prize award from Spain in the Spanish International DX Contest 1932. W4HY still finds some traffic. W4IIL is back from U.S.N.R. cruise. Another from Tampa is W4BOT. W4PAW has been spraying the ether from Clearwater Beach, with W4OT and W4IIL pounding the key. W4ZU and W4ZV took a trip to Georgia. W4AQT is on irregularly. W4NN is rebuilding. W4UX has a new crystal 250-watt job. W4AZB is on with crystal 150 watts. W4PAL with 4 watts input worked EAR224 and two VES's. W4TZ 30 watts input worked VK, OM, EAR, K5, K4, W7, etc. W4RU is vacationing in Hendersonville, N. C. A new ham in Orlando is W4AGJ. W4AYJ is active. W4ABL sends his 73 to the gang. W4AFV wants good traffic. W4AXY reports that crystal control is now used successfully. A peppy letter from W4AWO, Lake Worth Radio Club, says they have a storm relief net that includes VP2PA, HH7C, HI8X, CM8BY and others. They also want an all Florida net, and your SCM advises the reliable stations, who really want to keep East. Fla. Section on top, to get in touch with W4AWO at once. W4BMN makes application for ORS. W4TK is at WJAX. W4VP says that 7 mc. is "erazy with the heat." More traffic from W4BDM. W4GR is vacationing in Germany. W4ASR is on only for short periods. W4AGE is laying plans for a 100-watt MOPA. W4HC was heard on 7 mc. W4UJ is splitting the ether with his new 250-watt. W4AEM is handling some traffic. W4BIF is active. W4AS was at Arlington a short time ago. Send reports to W4NN, 329 East First St., Jacksonville.

Traffic: W4IIL 32, W4RU 30, W4AEM 18, W4AS 18, W4UJ 16, W4AGB 15, W4AJX 11, W4AZB 10, W4HC 10, W4BMN 10, W4DE 11, W4AER 10, W4MF 6, W4AKH 8, W4VP 7, W4TZ 7, W4P 4I, W4HY 4, W4BOT 3, W4PAW 1, W4PAL 1, W4TK 1.

WEST GULF DIVISION

NEW MEXICO — SCM, Jerry Quinn, W5AUW — W5AUW and W5AOD are pretty close in traffic this month. W5AOP has trouble with cows running into his masts. Hi. W5AOD and W5MP have combined stations. W5CGJ took his first traffic from his first QSO, W6USA. W5AOE has his 3.9-mc. 'phone going again. W5BVC was married on May 18th. W5AAX is on 14 mc. W5BQE, W5CGJ, W5BRV, W5AIC, W5BUY and W9GNK were all visitors at the SCM's shack.

Traffic: W5AUW 142, W5AOD 150, W5MP 76, W5ZZQ 49, W5AOP 20, W5CGJ 2, W5AOE 1.

OKLAHOMA — SCM, Emil Gisel, W5VQ — W5OJ is working schedule with W6USA. W5BOZ is back on the air. The Wichita Falls and Frederick Amateur Club picnicked at Craterville Park. W5BOE is still having trouble with new license. W5ALD reports it is too hot for traffic. W5BEX is working 1.75-mc. 'phone. W5BJT and W5UN are working 7 mc. W5BDX is on with a '45 TNT. W5CEB is a new ham in Enid. W5CMW just got his license. W9ESL paid a visit

to W5PP, W5KX and W5VQ. W5AEJ and W5BGX are on 14 mc. W5CJZ is a new ham in Oklahoma City. W5AEI is off due to moving. W5AND worked an Aussie. W5AOW has been QRL work. A number of hams in Oklahoma were favored with a visit from W5AOM of Buffalo. W5ATB is a new OBS on 'phone. W5AVK is crystal-controlled, using '45s throughout. W5AUA is building up a crystal-control rig. W5HJ is away to R.O.T.C. camp in Texas. W5AEI is back on the air. W5BHQ is rebuilding. W5AWG has moved back to his old QRA in Alva. W5PP-W5AJO are rebuilding to higher power. W5BKK is a new ham in Edmond. W5BQA has a new antenna system. W5GY is having trouble with the depression. W5QL had the misfortune of having lightning strike his station. By the time this report appears in QST, W5VQ will be on the air and will be ready for schedules. Let's have some more reports, fellows, and boost the Oklahoma Section up a little.

Traffic: W5OJ 125, W5ALD 23, W5BPM 7, W5CJZ 4, W5AND 4, W5AEI 2, W5AUA 4, W5BKK 2.

SOUTHERN TEXAS — SCM, H. C. Sherrod, Jr., W5ZG — During the past operating month the city of Kerrville, Texas, was the scene of a disastrous flood which completely disrupted all communication. Kerrville called upon the amateur radiomen resident in that city for help. W5BKE, Route Manager, W5BKZ, and W5BSF got together at once. W5HSF was selected as the operating station, the other men serving as the operating personnel. Their success was in no small measure due to the able cooperation outside stations gave, and equal credit for this boost so ably given amateur radio must be given W5AEA, W5WL, W5MN, and W5OW. W5BSF was on the air constantly for three days. The assistance of W5LP, who was successful in clearing serious interference from the frequency of W5BSF, was invaluable. Your SCM feels unequal to the task of adequately expressing the gratitude and pride that the members of the Southern Texas Section feel for W5BSF, W5BKE, W5MN, W5BKZ, W5AEA, W5WL, W5OW, and W5LP Gentlemen, Congratulations! El Paso: W5AEC is busy rebuilding W5AFW. W5AFS is sick. W5BOD is still rebuilding. W5DE is now crystal-controlled. W5ES will soon be on. W5NT has gone to Mexico. W5GI has the 56-mc. transmitter going OK. Corpus Christi: Henderson sends in the usual nice report. W5CMO has just received his license. W5CHL is a new ham. W5BXX is the station of the Corpus Christi Radio Club. W5ALV is keeping regular Army schedules. W5FH is using a pair of '45s. W5BRY is building a portable receiver. W5MS is on occasionally. Beeville: W5CLP reports for this city. W5WE is using a '60, crystal-controlled. Ex-W5AJR is planning a comeback. W5CLP is hoping to get over the back fence. Kerrville: W5BKE is recuperating from three continuous days of operating. College Station: W5BWB lent a hand to W5BSF in the latter's flood relief work. W5BZB has a new SW3. W5CT of Austin has been using the portable call W5CCZ. Barclay spent last RMNite with W5AUL in Abilene. W5CGD is now using 2 '52s with 2000 volts. Houston: W5BTD is a new ORS. W5TD manages to get on about once a week. W5LP is grooming W5ME, portable. W5BHO is keeping schedules with W5WW, W5AUL and W5AMX on 3590 kc. San Antonio: W5PF is operating in the 7- and 14-mc. bands. W5BWM is now crystal-controlled on 3.5 mc. W5MN is working the 3.5- and 7-mc. bands. W5CD has a Type '70 56-mc. 'phone rig. Our congratulations to W5ABQ, who, during the past month, took unto himself a wife. W5AHH is operator at the police transmitter, KGEZ. W5MN and W5OW did good work with W5BSF during the flood. W5CS will return shortly. W5BQH is building a 100-watt 3.9-mc. 'phone. This report completes my duties as your Section Communications Manager. For the past two years I have had the pleasure of serving you, and I ask that you give my successor the same cooperation you so kindly extended me, that we may make the Southern Texas Section of the A.R.R.L. a better place to operate in. Good luck, men, and goodbye.

Traffic: W5PF 36, W5BVG 18, W5RV 119, W5BVB 118, W5MN 347, W5BHO 24, W5LP 47, W5TD 7, W5BTD 5, W5BWM 1, W5CGD 28, W5CCZ 2, W5BWB 5, W5BKE 17, W5BQU 14, W5DE 26.

NORTHERN TEXAS — SCM, Roy Lee Taylor, W5RJ — W5CJL, a beginner with a '45, makes the BPL in a big

way! Our Chief RM, W5BII, comes through and busts into that BPL also. W5BCW is another high-stepper. W5CLT is a new ham. Another good traffic man is W5IT. W5BKH is now an ORS. W5AVF is still steppin' along. W5CFS is a new ham in Tyler. W5CCD is a new reporter. W5CAV is another first-timer. W5AID now has call W5MA. A new reporter from Dallas is W5BFY. More new ones reporting. W5CLY, W5BRZ, W5SU, and W5BEF. W5ARV is getting back on after the filter went out. W5SH is working on his 14-mc. 'phone. W5AUL sends a good report. W5AZB is leaving for So. Texas. W5ANU reports that W5AVF and he have had several hams as visitors. W5AJG is installing 14-mc. 'phone. W5BYF complains about it being HOT. W5BXY is handling traffic just right. W5CAM-CLF says W5CLF, W5AXT, and W5PN got a nice write up in Dallas papers about their fine work with Kerrville during the recent heavy rain. W5CDG is installing a 500-watt screen-grid tube. W5QY and W5BUH are still at Worth Ranch. W5RJ is busy as a bee with convention plans. Please tell everybody that the convention will be held at the Blackstone Hotel, Ft. Worth, Texas, October 7th and 8th. And we promise that it will be an FB Convention! Write the Convention Chairman and SCM, Roy L. Taylor, 1614 St. Louis Ave., Ft. Worth, Texas, about whether you expect to attend.

Traffic: W5CJ 569, W5BII 525, W5BCW 342, W5IT 263, W5BKH 217, W5AVF 162, W5CCD 77, W5CAV 31, W5AID 26, W5BFY 2, W5SU 14, W5CLY 31, W5BEF 8, W5AUL 43, W5AZB 5, W5ANU 15, W5AJG 32, W5BYF 18, W5BXY 52, W5AAQ 96.

CANADA

MARITIME DIVISION

NOVA SCOTIA — SCM, A. M. Crowell, VE1DQ — VE1AE leads this month with 180. VE1BC returns to the air on 3.5 mc. New man on the 3.5-mc. band in Halifax is VE1AS. VE1BY is on 14 mc. VE1CW has increased power. VE1ER reports a few. VE1AG took a shot at 3.5-mc. c.w. NEW BRUNSWICK — VE1AK, VE1BO and VE1BA are on 3.5-mc. 'phone. VE1DC and VE1DP visited A.R.R.L. Headquarters during recent trip to the states. VE1CY and VE1BV are away on vacation. VE1EB is new man in Sumner. N. B. VE1EL is a newcomer in Moncton.

Traffic: VE1AE 180, VE1BC 45, VE1ER 3, VE1DQ 2.

ONTARIO DIVISION

ONTARIO — SCM, H. W. Bishop, VE3HB — All ORS who have not had their certificates endorsed by the SCM during the past twelve months, please send them to him for his signature. VE3GT can be found on 3505, 7010, and 14,020 kc. VE3GK worked F8RJ. VE3CP has been having good luck using 3 watts input. VE3BA is on the air in Brantford. VE3AU is back on the job. Welcome. VE3MG in Oakville. VE3LJ is looking for traffic schedules. VE3HV has been having good luck with 1.75-mc. 'phone. VE3IG reports the DX cards are rolling in. VE3EJ is getting ready to increase power. VE3AM is chasing flies off of cows. VE3JE is trying to hook VKs. VE3CA is making a specialty of three-way QSOs. VE3VM is doping out a reliable receiver. VE3HE worked 10 Ga, PA, ON, and OK on 14-mc. 'phone. VE3DD handled 22,875 words last month in traffic for the OFB. VE3LX visited the SCM. VE9AL is QRL golf, flying and holidays. VE3BV has built a new receiver. VE3DW is keeping his schedules. Introducing two new hams in Toronto, VE3MJ and VE3RT. VE3PN has rebuilt. VE3AD has procured that much needed power supply and filter. VE3SA was visited by VE2DP, VE8DHU and VE5FI. VE3HN is an ORS applicant. VE3DB is still alive. VE3GL is interested in 56 mc. VE3LY is a new ham in Fort William. VE3CP is rebuilding. VE3HB has increased power to 50 watts in PA. VE3HZ and VE3KC spent a vacation at VE3GC's cottage at Rondeau National Park. VE3CM is dragging in the odd DX. VE3WM won't answer anything but DX. VE3LW is getting up a 56 mc. field day. All the gang get set for the Big Convention in Toronto in October, date to be announced later.

Traffic: VE3CP 77, VE3HB 24, VE3GK 22, VE3HN 13, VE3HV 9, VE3CA 8, VE3GT 6, VE3BV 6, VE3AU 5, VE3DW 2, VE3GL 1.

QUEBEC DIVISION

QUEBEC — Acting SCM, J. C. Stadler, VE2AP — For the next few months kindly forward all reports to Mr. John Stadler, VE2AP, who will act as SCM for SCM Blais during his absence. If you care to, 'phone your report on the 16th to Westmount 5947. VE2BO is busy sailing. VE2CO pounds occasionally. VE2CX handles quite a bit of traffic. VE2CU is still with the sub-eskimos up north. VE2AG is rebuilding at a new QRA. VE2AA is on only for DX on 14 mc. Heard on 14-mc. 'phone: VE2BE, VE2CA and VE2AR. Heard on 3.5-mc. 'phone: VE2CM, VE2EM, VE2AP. New calls heard recently: VE2BM, VE2EE, VE2EH, VE2EL and VE2AH. VE2DW is rebuilding. VE2CO's MOPA is working OK.

Traffic: VE2CX 14, VE2DW 5, VE2CO 2.

VANALTA DIVISION

ALBERTA — SCM, C. H. Harris, VE4HM — VE4DT and the OW and VE4FK visited the Edmonton gang. VE4GY won the cup in the miles per watt contest. VE4IZ was a close second. VE4EO is building a 'phone. VE4GT worked a "J." VE4DR reports a new ham, VE4AB. VE4BJ and VE4BP are heard occasionally. VE4BV is heard pounding the old key again. VE4DQ has QRT for the summer. VE4EA gives VE4HM a hand to iron bugs out of Class B modulation. VE4EC built new receiver. VE4EW moved to Camrose. VE4FJ is QRL. VE4FR is changing to crystal. VE4HQ is the star Alberta 'phone station. VE4GD is on holidays. VE4EA and VE4BW have been giving interesting lectures at the Northern Alberta Radio Club at Edmonton.

Traffic: VE4DT 25, VE4HM 10, VE4DQ 3, VE4EC 2, VE4EO 2.

BRITISH COLUMBIA — SCM, J. King, Cavaleky, VE5AL — VE5DB makes the BPL on deliveries. He and VE5DH are handling traffic for the Y.M.C.A. camp on Howe Sound. VE5AG departed for the Cocos Island to assist in the treasure hunt. VE5AM is hitting his stride again. VE5AC has left for camp. VE5AL is relieving on schedules for the gang on vacation. The Victoria gang are keeping VE5EZ on the air 20 hours a day. VE5HP is still their star schedule and traffic man. VE5HR and VE5EC are QRL. VE5DV has a new MOPA. VE5FG is on vacation. VE5GT got caught for a traffic total.

Traffic: VE5AC 70, VE5AG 18, VE5AM 52, VE5AL 22, VE5DB 247, VE5DH 245, VE5EZ 8, VE5DF 3, VE5FG 30, VE5HR 7, VE5EC 1, VE5HP 143.

PRAIRIE DIVISION

SASKATCHEWAN — SCM, W. Skaife, VE4EL — In this, my first report as SCM, I wish to thank all those responsible for my nomination and election to this office. I am looking for good improvement in our traffic standing. What we want are short distance schedules. Let us have four lines operating out of the following cities: Prince Albert, Saskatoon, Swift Current, Moose Jaw, and Regina. Those willing, send in names, day and time, and frequency, to our Route Manager, VE4BB, at once, so that he can arrange matters without delay. We owe a hearty vote of thanks to our retiring SCM, W. J. Pickering. Bill has turned in your reports for six solid years. VE4GR has done some emergency work this month, and probably saved more than one life. VE4ES says three junior ops arrived at their home recently. VE4JN hopes to be on the air again next month. VE4HE will not be on for a few weeks. VE4AT now has a peach of a note. VE4BB and VE4GR are on consistently. We have two new hams at Viscount, VE4IJ and VE4AZ. VE4IL is rebuilding transmitter. VE4DI is rebuilding receiver. VE4JG is on Sundays. VE4IA will be on for locals. VE4CV is active on 14 mc. The Saskatoon Club has closed down until October. VE4BF works DX. VE4JV is experimenting on 14 mc. VE4EM is on vacation. VE4BM can be heard on 3.5 mc. late in evenings. VE4EL is waiting for reports from all of the gang.

Traffic: VE4GR 49, VE4BB 36, VE4HX 21, VE4EL 16, VE4BF 3, VE4AT 2, VE4CV 1.



CORRESPONDENCE

The Publishers of QST assume no responsibility for statements made herein by correspondents

"Recollections"

1428 S. Norton Ave., Los Angeles, Calif.

Editor, QST:

Being somewhat of an "Old Timer" in radio myself (both in point of age and years of actual experience) I read with great pleasure the very interesting articles on radio—or "wireless"—history contributed by various Old Timers from time to time.

I was particularly interested by your reprint of part of Mr. Kintner's paper in July QST, and thought it might be of interest to add to his remarks some amplifications and a few corrections.

It happens that I was one of the men who conducted the long-range tests Mr. Kintner describes between the 100-kw. installation at NAA and the U.S.S. *Salem*, NTP, in the early spring of 1913, and can therefore give the following from my own knowledge.

The views on both pages 31 and 32 of July QST show Fessenden transmitters at Brant Rock, probably about 1910. Arlington, NAA, was not then in existence. The view shown on page 31 is seen better, and from a slightly different angle, in Fig. 251, page 205, in J. Zenneck's *Wireless Telegraphy*, 1915. This same transmitter is shown very clearly as finally modified and installed at NAA, in Fig. 72, page 361, in Morecroft's *Principles of Radio Communication*, 1921.

The modification consisted chiefly of the substitution of a drum, concentric to the spark gap rotor, for the crude hoops shown in the original view as bearing the stationary electrodes, since the latter did not present a true concentric path of travel for these electrodes in their circumferential adjustment for the timing of the spark for synchronism. This modification is very clearly shown in Fig. 73, Morecroft, and a further modification was made later when a cover plate was added to the drum after an unfortunate accident in which one of our crew lost his life by falling into the spark gap rotor.

The NAA-NTP test was doubly interesting to the Navy personnel, for a reason not stated by Mr. Kintner in his paper; namely, a comparison between the equipment described by him with the first Poulsen Arc, as furnished by the Federal Telegraph Company of Palo Alto, Calif. In this test the Navy men for the first time used an arc, a "ticker" or "slipping contact detector," a "heterodyne" in which the local frequency was supplied by a miniature transmitter actuated by

a 250-watt arc, and a vacuum-tube detector with cascade amplifier arrangement.

What stirring days those were!

A few of us young (then!) Navy brass pounders, transferred from our ships in mid-summer 1912 to a farm just south of the Potomac in Virginia: told to put the Navy's first high-powered radio station into commission; the station itself, four walls around a large excavation which later on became the basement where our main power supply transformers were placed, and which even contained a "brig" for the especial benefit of such of our sinful brothers who failed to navigate the "bridge of sighs!" The towers (two of 450 and one of 600 feet) had then not been completed, and littered our farm with red-leaded steel; a persimmon tree, in full bearing, visited by Mr. Junius E. Martin, Electrical Expert Aide from the Brooklyn Navy Yard, who was disappointed by his first sample of persimmons and declared it a "trifle rough"; the day we put up our first antenna, a single-wire "T" 450 feet in height; and, listening in with an old W.S.A. Co. "I.P.-76" tuner using "Perikon" detector, heard Poldhu, Coltano, and Lyons; Glace Bay came roaring in with an indescribably beautiful note of bassoon-like quality.

What a heart-breaking experience when our first section of main antenna, 12 wires strung from 88-foot steel-truss spreaders, collapsed when we got it up to about the 300-foot level!

Our first Thanksgiving dinner at NAA, in our own "Ward Room" with our skipper Lt. (now Captain) E. B. Woodworth gracing the festive occasion by his presence at the head of our table.

Names like Woodworth, our captain; "Jack" Scanlin, our leading chief, now the Grand Old Man of Navy Radio; Bill Eaton, "Newt" Smith, Lester Damon, "Fritzie" Hildum (who was inexpressibly shocked one day to find an inoffensive 150-watt lamp globe resting on the pristine surface of his desk, and upon picking it up was kicked clear across the office by a terrific "static" charge picked up off our main belt); the genial Sam Smith of Mexico, Maine; Clarence Mott and Otto Clark; Henry Pitts and Palmer, later on a flier; George H. Clark, the "Wizard" of radio, "Windy" Wallis, pounding brass for Mr. Kintner during the NTP tests; F. H. Kroger, eminent electrical engineer, who did things to our 100-kw. generator that left us pop-eyed with surprise and horror; the gentle C. V. Logwood of the Federal Company (now gone beyond).

Xth OLYMPIC GAMES

LOS ANGELES 1932

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OF THE GAMES OF LOS ANGELES
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JULY 13 1932.

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Gentlemen:

W6USA, the official station of the Olympic Games has tested several short-wave receivers in an effort to find one with the sensitivity necessary to maintain international schedules, and with sufficient selectivity to do it in the severe interference now prevailing in the amateur bands, there being about one thousand amateur stations in Los Angeles County alone.

The answer to this problem was found in the Hammarlund "Comet Pro." The first week we were on the air with this receiver we worked all continents with loud speaker volume, including such countries as England, France, Austria, Czecho-Slovakia, South Africa, Japan, India, China, Ecuador, Peru and many others.

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Sincerely yours,

Norman L. Madsen
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"NL" of W6USA

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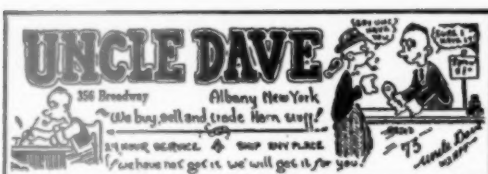
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What shipmates! What recollections and reminiscences!

Ah, me, one could write a lot more, had one not taken up too much editorial time already; so must bring this history to a close.

So, trusting that some of the Old Timers and Shipmates will see this and remember.

— W. M. Blumenkranz, Lt. U. S. Navy, Ret.

Here or There?

41 Beacon St., Barre, Vt.

Editor, QST:

During the years that I have acted as Official Observer for the A.R.R.L. I have had occasion to write to many amateurs relative to the quality of their notes, especially those which were broad and rough. In all cases I have tried to give honest opinion, with the result that many of the recipients of my notification cards seemed to be shocked at the idea that their notes were anything but crystal d.c., or at least p.d.c. They usually informed me that all their reports had been d.c., and as a further proof claimed that their monitors also showed this to be true. "Wasn't I confusing their signal with that of somebody else?" etc.

All very well, but I would hate to think that my own signal sounds the same in Oshkosh as it does in my monitor!

One case in particular related to a prominent W1—station. On the evening that I logged and QSO'd him his signals seemed fully 50 kc. broad and so like mush that it was almost impossible for me actually to locate them. And yet he said that all other stations had given him p.d.c. reports that night!

In a recent issue of QST W8OK was reported by four stations as having a "prehistoric" signal. But I, the heartless critic that had condemned so many p.d.c. notes in the depths of my ignorance, had reported his 500-cycle crystal note as being of the highest quality.

Several years ago I knew a ham who was putting a d.c. signal into Australia, but to me, only ten miles away, it was far from being d.c. Not being able to go to Australia to hear it, the signal had to remain r.a.c. with me.

All of which might lead one to ask, "What shall I believe?" Shall we report the signal as it may be while leaving the sending antenna, or as it sounds to us, wherever we are? Obviously, only the latter is possible, so why be shocked if some hard-boiled observer informs you that your supposed p.d.c. note is "ruff spk coil" in his town? You can assume an air of self-complacency mixed with superiority, and laugh up your sleeve at the gross ignorance of the official observer. But heaven help you if the R.I. happens to be boiled as hard as the observer was!

— Roy L. Gale, W1BD

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76 Wir bitten darum, sich auf QST zu berufen — Sie weisen sich dadurch aus und unterstützen dadurch gleichzeitig QST

Ham Magazines

Ft. Sill, Okla.

Editor, QST:

I wish to say that I do not wish to be without QST, for it is the best amateur magazine I have ever read, and I read about six radio magazines each month. The different departments are as near perfect as can be expected and there is always plenty of helpful information for those who will take the time to read the articles.

Here's a little dope on my station. I am using crystal circuit as per November 1931, QST, built up as a panel job with 245 crystal oscillator, 245 doubler and a 210 amplifier. I have 250 volts on the oscillator, 400 volts on the doubler and 600 volts on the amplifier. I have a milliammeter in each h.v. positive lead and a radio-frequency ammeter in the antenna. Also one filament voltmeter which is used to check all filaments and a 0-2000 v. d.c. volt-meter to check the high voltage with. Provision is made to use a 50-watt in the last stages as soon as suitable filter condensers can be procured.

— St. Sgt. R. F. Hinck, W5BQA

Results—International Contest

(Continued from page 52)

CVV DDE* DEP DJX DMQ DMU DOA DOU* DOW DPI
DQA DRI DSZ DTB DXM ECC EEP EFH EGH*** ELCEQE
ETL EV* EVD EVM EYF EZ EZZ EZZ* FDE FF FF
FFW FGS IU KO NG NO OD SF SN SO*** TV VO VQ**
WB WO* WX* YO** YU** W7 AEM ALB AMP APF AYD
RAC* BB** BCV BD* BIG BO BSX BT CB CD CH HS KK*
KO QIT* VN*** VT** W8 ALT ANO ANT AUU BAX BDA*
BIS BIZ BKP BNY* BOS BSF BVP CAU*** CAW CBF**
CIF CJP* CKX CO CSS CU* DED* DFH DGP* EGY ERJ
EVE EX FAP FEA* FGV MK PA SC* ZB ZN* ZV* WY ABA
ADN AFB AEN ARL ARN ASQ AVP GHK BJX BN BNT**
BPF BPM BTU BVI* BVY CE CES CGX CL CNO CSB
CWK CXR CY DO** EGU EKV* ELE ERV EVE FAW*
FDO FDO* FFO FHY FMK FNO FPI GCG GCX GDH*
GDM GHK* GKA GV** HBA IH* IJ* KW MC* OI VD YB
XI AA** AX D* DX U ZLJ AR AX ZLJ CE CI CP CU DN
DW FI GJ GK GO GQ HI ZL3 AQ AW* BK BM BN CC*
DN* PA ZL4 AS DB ZS CB IN DUTCH EAST INDIES: AC
9GH EAR 96 JI CT* DA DV EJO J2 CB CG CM J3 DL* DQ
SW J7 CF K6 COZ KAI DP IR NA* SP IBT W3 CCF W4
BEQ W5 AVY BK BSF BUZ BW CC* IT VE VV VX WJ
W6 ADK AM AMP AX BC* CG CIO CV CXW* DOU EDW
EGH* EHO NA PH SP VO** YO YU W7 QI XI AA AX ZL2
CI ZL3 AQ AZ CC IN NEW ZEALAND: AC SWE CM ZLC
CTI AA CQ DK DJ DX GU D 4ADB EAR 96* 97 224 F8 AH
CGK PK SA TW FEA* G ZL2 SBY* HAE 9A** HZ HK DA
I IRH JI CT DM DV* EQ* J3 CG CO J7 CF* K4 RK* RY K6
ACW AJA ALM* ARB AUO* BOE COG COZ* DV EM FAF
FWS WOX KAI IR* JR NA OA 4J OM ITB PA OGH SPI
AF BC* SP3 AR TI SPI VE JLL ADT VK 20C 32X W1 AAO*
BDI* BKF BXC CK COX LO KC MK* SI ZJ ZW W2 AY
AZO BBA BI BST CEX CMO CMA CTA DM* DN* KH NZ
VH* WC W3 AFL AMS ANH APN AVI BES BUY CCF*
CDK CEP KE MD OT UT W4 ABT* ABY* ACA AMI ANH
AXZ* MK* PCV* SIF TP W5 ACD* AH AQY* ATF AUT AVR
AZV* BKE BML* BWQ CDC* CT GA LY MS NW PI* UN
UX* VJ VV W6 ACY* ADK* ADP* AEJ AGA AHP* ARZ*
AIT AKD AKL AM* AMO ANO AOJ ARZ ATW AWP AXV
AZL AZZ BAU* BAX BBM BBV BC* BFH BHM BIP BJA
BLS BOQ* BOZ BR BSS BTF BVC BY BVI BZE CAE CAR*
CCZ CEN* CGC CHA CIO CLP CMO CNX COD* COE CRI
CUH CVF CVZ CWE CWH* CXO CXW* CVV DDE* DIC
DLI* DMK DMS DOU* DO DOA DTB DUC EDJ* EDO
EDV EGH* EHO ELC EOE* ERL ERU EWI EWJ EYGEY
EZH FAL* FCL FCN FFE FGS FHA FKC FT GKC JB KJ
MJ OG* OS PT RO SO* TM TY VO VQ* WB WN WO WY
YU* YU* W7 AAT* ALB* ASY AVL BAC BB* BD* BIL CS
DL* DP HE HS* KK KO TS VN VT* VY W8 ABS ANO BNI
BOX CAU* CBF CU CXR* DGP EER EGV EVE* SG* ZN*
W9 ADG ADN AFN AFN AHO AKJ ARJ ARL* ARN* AS*
ASQ ASW AZY BEG BIL BIV BNT BO BOF CME* CND
CNO* CXR CYL EGE EOC FDQ FIM FMK* FPI FVZ
GCK GDH* GGH GSO II NK VL* XI AA* AX D* X 7AA
26A IN THE PHILIPPINES: CT IAA K6 COZ VK3 HL VP
WZ ZX VK5 MY RH VK6 WL W3 CCF W5 IT W6 AHP
AHZ AKB AM AOR BAX BC BY CEO CLO CTD CUS
CVW CZX CXW CZQ DEP DVU ECW EDO EGH ERL EXQ
FCN HM SN VQ YO YU W7 KK

LOGGED IN SOUTH AMERICA

IN CHILE: EAR 96 G SBY W1 MK W2 DM UK W3 CCF
CDX CXL W4 ABT ALP DW EG W5 ABH AY* BKC BMI
BSF BUZ IT LY NW VE W6 AU AM BAX BYC CAE COQ
CXO CXW DDE EGH EGM SO UC VO W7 VT W8 CAU SG
W9 ARL BHH BIR BN BNT EGD EPT FMX HFD GV XI

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2 volt tubes		55 Duplex Diode Triode	57 or 58 Triple Grid Super Amplifier			
		New 6 volt tubes				
230 Det-Amp.....	\$.75	Can be used on AC or DC	UX or UV 199's.....	\$.55	UX226.....	\$.45
231 Amp.....	\$.75	236 Screen Grid.....	UX200A.....	.40	UX240.....	.50
232 RF Screen Grid.....	.75	237 Det-Amp.....	UX201A.....	.35	UX245.....	.45
233 Pentode.....	.75	238 Pentode.....	UX222.....	.95	UV247.....	.60
234 RF Pentode.....	.75	239 RF Pentode.....	UY224.....	.50	UX171A.....	.60
			UY224A.....	.65	235 or 551.....	.65

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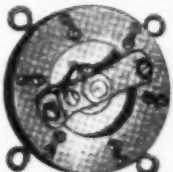
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WOX VK3 BW TW WL W1 AIL BDI MK W2 BST BWD W1
ANH APN BIM CCF CDX CXL MD W4 ABT ABV FT SE
W5 ABO BCX BDI BSP BZO CAW CT GA IT VT VY W6
ADK AHZ AM AOH BC CEN COQ CXW DBD DCR DDE
DOU EBS EDV EHX SO VO WX YO W7 AQ W8 BOB
BOX CAU CSS CU CXK CXR DV DVB DY LL W9 ARL
ARN ASW BBJ BEG BIF BNT BOF CME CU EOC EUL
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ZLZ AB CI FI GN JE ZLJ AQ CC

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AJM BDI CDU CMX CPH LZ MK PH W2 AIS AX BBB BSR
UK W3 ADO CCF MD* W4 FT VM W6 LK W8 AFM AGH
W9 CKT Y1 2DC 6KR ZLI AA FC IN MOROCCO: NY IAB
W1 AF AOM BDI* HQ JO MK MX W2 AOI AZO BG BHW
BM CDR COK W3 AKU ANZ BG BST CCF* W8 ADR AFM
B2B CJR DG DNC DV EGE EPE EUO W9 ADN BZH GDR
GUO IN SOUTH AFRICA: GTI AA* BX EAR 96* 182 IS
224 FM* BIP H* G2 H* GP GS MI* VL HAF 4D* C
8G J 1CT ON 4OR PA OKW PY 1BA 2AJ 3AJ SP 3AR* VS7GT

LOGGED IN ASIA

IN JAPAN: VK2 JT ZW W6 AHP NO YUT W7 DL

LOGGED IN EUROPE

IN AUSTRIA: AU IDE CN 8MJ CTI AA GU EAR 11 96 IS
EI 2D 8C ES 3HT FMC CR EHX IH G5 GU WY GA GD
VK LA 2U SP 3AR ST 2D VS 7GT VU 2BG W1 BDI CPH LZ
MK PH W2 AIS BSR FD HJ W3 CCF CDK CM MD W4 AGR
BBB Y1 6WG IN BELGIUM: W 1MK IN FRANCE: CN
MI MJ CT IAA CV SEV G 5BY PY 2AJ ST 2D VS 3AC W1
AE ALE AR BDI BDX BDI* BEO BHO BLO BO
BMN BSD CHN CHR CIJ CJD CPH DBB HQ JO LH LZ
MK* MX TW ZJ W2 AIS AKK AOI AOY AQB ASL BHZ BG
BSR* CDA DMA FL HJ HW IM VD W3 APN ARS CDN
CKD MD* W4 AGR AKH DW MR W8 CU Y1 6WG IN
GERMANY: AU 1DE* CM 8AZ CN8 MI* MJ* CTI AY BG
GU EAR 204 24 FM8 CR* EG IH K5 AA NY IAB* PRIC
JH* PY 2QA* ST 2D TF 3TP VE 1BV IDL 2CD 3YM VO
2GB* 80R* VS3 AC ACB VS7 GT* W1 AE* AIL AWD BDI*
BHM BSD CM CPH* EF LZ* MK* RA WK WV* W2 AIS
AJD AMR ARB* AZO* BSR DJO DN DR HJ LF MD MI
VD* W1 ANU BFT CCF* CDK CM DY FO MD* W4
AGR* W8 BLP CJR CKX CPC CTE CXR W9 IH* Y1 6WG*
ZS 4M* ZU 6W IN GREAT BRITAIN: CM 2JM SAZ CN
MI MJ* FM8 CR* EG* GK* HT IH* HC 2JM HJ IAK
K4 RK* K5 AA LU 2CA NY IAB OM 2RC PK 3BM PY IF
PY2 AJ BX* QA PY3 AD ST 2D* TF 3TP* VE1 AL BR EW
DL* DQ DR* DW VE2 CO CX VE3 HE JM LL VE4 BQ* VK
2XU 4GK VO8 AN LC* MC VS 3AC* 6AE 7GT* VU 2BG*
W1 AE* AF AHI* AIF AIL* AIP* AJD ARL* ASL ASP
ATE* AVI AWD* AYA* BAQ* BDI* BDW* BED BED
BHM* BNM* BOV BSH BSK* BVL BXC* CAB CCB
CDN* CHR* CIL CJD* CNU CPH* CQR DBB* DBY
DCH* DDW DLV DMO* EF* EX FH* JO KH KW* LZ*
MK* MX* PH* SZ UC* VC* WK* WV* YR ZJ* W2
ADP AFU* AGX AIF AIS* AKK* AMR* ANO ANU ATU
AOB* BAK* BG* BHW* BHZ BRB* BRO BSR* CDA*
CJM* CUG* CUP DJO* DK HI* IM* LE MI* TP VD W1
ACX ANP APN AOK AOT ARS* BAN BMV* BFM* CAD
CCF* CDX* CJK CKT CM* DC* DI* EQ MB MD* PC*
ZG ZX* W4 ABZ* ADX* AGL AGR* AHP AKH* CE DZ*
IJ MR* OT* QL W6 AHP CLZ CXW* DGO OW* W7 AUL
W8 ABP AWW AH BIX BLB* BSE BZB* COW CSS CXK
DED* DMK DOD EUO EYE EVS SG TP* W9 ADN* BRX*
DKU DUR ERU* GGY* GY* IJ* Y16 KR WG* ZC 6JM ZD
2A* IN HUNGARY: CM 8VY CN8 MI MJ* FM8 BIP CR*
EGT* GK* IH* PK 3BM ST 2D VE 2GO VO 8LC VS 3AC
7GT VU 2BG W1 AIL* AIX* AML* APN* APL* ATE*
AWD BDI* BKS BXC* CDR CHR* CJD* CJO*
CPH* DCH JO LZ* MK* MX* PH TW VC* WV W2 AD AIS*
ARB AZO BRB* BSR C2P* FD HJ TP W3 APN* BG BSR
CCF CDK* CEP CM MD* W4 ABZ AGR AKH AR W6 BRD
W8 ADS AFM BLP CKZ DHC ZC 6JM IN IRISH FREE
STATE: CN8 MI MK* K5 AA NY IAB PY A2BN VE
4BQ W1 AIX AZE BDI BEO BNM BXC CCI CHR CLZ CIJ
CJD CQR DBV DCH EF KW LZ MK MX WV ZJ W2 BAK
BG BSG BSR CIM C2P DJT IM VD W3 ALH BPM BSO
SEG PY 2BN VEI BV DL DO W1 AF AFR ASI AWD BDI
BH CIL CIJ CO DBB DCH HQ LH LZ MK TW ZJ W2 AD
ADP AIS AKK AUP BRB BSR CDA IM W3 APN CCF CK
DC MB MD W4 MR W8 BF TP W9 GGY IN NETHER-
LANDS: CN 8MJ CV5 BD EVM FM8 CG GK K4 RK OH
SNE PAO WX XW ZK PY2 AJ QA ST ZG VE IDL W8 AW
W1 AIL BDI* EF LZ MK MX W8 BSR VD W3 CDK MD*
W4 AGR* EC W8 EUO IN NORTH IRELAND: W 1MK IN
NORWAY: W1 CHR LZ MK W3 CCF W4 AGR W8 CKX
CXV IN PORTUGAL: HB 9Y ON4 JB J1 W1 BFT CJD DBB
W3 BOV CCF CDK YVF ZX W8 ACZ CJR IN RUSSIA: W
IAF 2 ZX IN SPAIN: LU ICA* ON 4RX IAB PY 2AV Vei BV
DR VE3 BM W1 AIF AUU AYR* BDI* BHM* CGV CIJ*
CMX DBB DCH DDU EF* FH HQ LH LZ* MX* VP ZJ*
W2 ADG AIS ANO ARB ASV BHW BSR* BUW BWP CCF
CKR HJ JN VD* W3 APN* BG BGG BFM CCF* CDE CKE
MD* W4 ADX AER AKH MRS* SF W6 AHP BPG BPI
BLP BOS BZB CJR CTE CXK* DHC DMK DVS DXV ERZ
EUO PE SG W9 AZZ BFB IJ X 1AA* IN SWITZERLAND:
W1 AIL MK MX PH W3 BLR MD

LOGGED IN NORTH AMERICA

IN CUBA: CE 2RC G 5BY PY2 AJ BQ T12 DB TAO W3 FX
W5 CAW W6 BBZ DTB W7 ALZ AMP AWL BAC X1 AA IN
IN MEXICO: CE 7AA HG 2JM LU ICA OA 4J PY A2K AK
1AA IN NEWFOUNDLAND: CN 8MI CT IAA 4A HP QB WAF
JAO EAR 96 226 EI 8B GQ 226 Q 226 Q 226 Q 226 Q
1G 3C 4D HB 9K HC 2JM OA 4Z OH 2OG 3DEM 3NF JNP
OK 2VA ON 4JE PA OLD PY 3BQ SM 3XJ UO 80F VE3 CM
FJ VP IJA W6 CBP W9 GV

(Continued on page 90)

JR. CAR
BWD WI
VY FT SI
CR DDE
W8 BOS
W9 ARL
QC EUL
ZLI IN



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4H GHD	.80	457	.80
4D* H8	.80	458	.80
4D* H8	1.15	471-A	.45
4VS7GT	1.38	480	.50
	.80	482	.63
	1.38	506 1/2w. rec.	3.95
	.88	510 15w.	3.95
	2.50	503-A-11-45	14.45

Improved 5-Meter Super-Reg. Receiver



Accepted and enthusiastically endorsed by many prominent experimenters, following its introduction last month. Setting as it does new standards of excellent performance and low price. Completely described in our July adv. It's cheaper to buy this AIR TESTED 3 tube receiver than it is to assemble a kit that may not function properly. Using 2 type 37—one type 38 tube. Unconditionally guaranteed at **\$12.45** Less tubes.



Navy Type Telegraph Key

List \$3.60. Navy knob—1/4" Tung—\$1.25
sten contacts. While they last....

Genuine Baldwin Phones

012.00 List — Mica diaphragm. Limited quantity — only 2 pair to a customer. **\$3.95** Special.
Type imported 4000 ohm feather weight phones. Special. **\$1.35**
15 Bauman Head phones; 2500 ohms; brand new; complete with head band and cords **1.00**

LITTLE FUSES — Complete assortment of sizes at Special Prices

LEEDS—Special Type Tubes

Leads 888 Rectifier tube; 30 day guar. **\$2.00**
Leads 866 heavy duty Mercury Vapor tube. **2.25**
Leads UX 210 tube; guar. **1.50**
10 mag. antenna phasing coil completely water-proofed. **.75**
10 A. 200 ohm, 30 H. 125 mil choke. Special **.79**
10 Gap sockets. 7 for. **1.00**

SPECIAL



Leeds SUPREME transmitting key. Ideal for beginners practice set. List **\$1.75**.

Leeds Monitor

Our new individually calibrated band spread monitor is another LEEDS special that is cheaper to purchase at our new low price complete, than it is to assemble a kit following Handbook specifications. Fully outlined in our July adv. Unconditionally guaranteed. **\$9.95**

National and R. E. L. Sets and parts at lowest wholesale prices. Let us quote you on your needs.

WESTON METERS

Model 267 — List **\$16.25**
Front panel mount. There are only a few of the following numbers left. **\$3.95**
0-15 V.D.C. **\$3.95**
0-20 M.A.D.C. **\$5.00**
0-30 " " " " **\$5.00**
0-150 " " " " **\$5.00**
Other sizes at **\$16.25** net

No. 398 Gold Bug Automatic Transmitting Key

\$12.50 List. Simple in construction, correct mechanically, and electrically rugged and durable; 3/32" contacts, complete with cord and plug. Brand new in original cartons. **\$4.45**
While they last...
No. 10202 Extra heavy 3/16" contact. **\$4.45**

LEEDS

Transformer

2 1/2 volt-10 amp.

10,000 volt insulation.

\$2.75

Leeds mounted filament transformer; 7 1/2 v. center tapped; 5 amps, 10,000v. insulation **\$2.95**

Leeds Transformers

For speech input mixing panels; feed your phonograph, telephone line, tone &c. into your transmitter simultaneously with your speech. Tube to line 20,000 to 500 — 200 — 50 ohms. Line to line 200 — 500 to 200 — 500 ohms. Line to grid 50 — 200 — 500 ohms to grid. **\$3.30**

FLECHTHEIM Transmitting

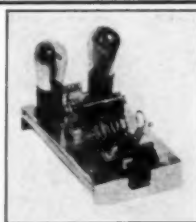
Condensers

High tension non-inductive transmitting condensers used by over 50% of the Broadcasting stations.

Cap. Mfd.	Former list price	Special
Type TC	1000 v.d.c.	750 v.r.a.c., r.m.s.
1.0	\$3.75	\$1.50
2.0	6.50	2.50
4.0	11.00	4.50
Type T	1500 v.d.c.	1000 v.r.a.c., r.m.s.
1.0	\$4.50	\$1.88
2.0	8.00	3.25
4.0	14.00	5.50
Type TH	2000 v.d.c.	1600 v.r.a.c., r.m.s.
1.0	\$10.00	\$3.50
2.0	15.00	6.25
4.0	25.00	11.00
Type HP	3000 v.d.c.	2200 v.r.a.c., r.m.s.
1.0	\$20.00	\$7.50
2.0	32.00	12.50

A New 5-Meter Transmitter

An efficient push pull oscillator. Isolantite condensers and sockets throughout. Tank condenser double spaced. Will operate on any UX tubes. Can be plate or grid modulated. Wired and tested **\$7.85**



Kit model as illustrated in Aug. QST. **\$6.00**

Thordarson transformers & Chokes — Drastic Cuts. Why gamble, when you can purchase nationally known apparatus at inferior merchandise prices? Items listed below are typical of the entire line.

T-2387	2000-3000ct	300 w.	Special	\$10.85
T-2388	3000-4000ct	300 w.	Special	14.25
T-2389	3000-4000ct	1 K.W.	Special	17.10
T-2098	1120ct	150 w.	Special	5.14

CHOKES

				Special
T-1700	.130 amp.	28 H.	231 D.C. res.	\$2.54
T-1998	.160 amp.	27 H.	190 D.C. res.	2.83
T-2071	.150 amp.	18 H.	240 D.C. res.	5.70
T-2027	.300 amp.	23 H.	134 D.C. res.	7.70
T-2073	.500 amp.	26 H.	135 D.C. res.	9.68
T-4451	.150 amp.	25 H.	291 D.C. res.	5.70
T-4456	.250 amp.	25 H.	140 D.C. res.	8.55
T-3100	.200 amp.	15 H.	125 D.C. res.	5.70

Filament Transformer 2 1/2 v. 10 amp, 1,000 volt insulated. Special. **\$1.15**

Leeds 80-160 meter band Crystals; one-tenth of 1% accuracy. **4.35**

Leeds large type crystal holder; 2 1/4 x 2 1/4 x 3/4". Takes crystals up to 1 1/4" square. **1.45**

Leeds special 866 filament transformer; our latest model; steel encased with Bakelite panel at top; tapped primaries; 2 1/2 v. 10 amps. 12,000 volt insulation. **3.95**

Leeds 7 1/2 volt center tapped, 7 amps, 12,000v. insulation. **3.95**

Leeds swinging choke — 2-40 H. 150-0 mills. **4.75**

For other transformers see April issue.

After several months of development, we are pleased to offer a new 210 type tube with new low internal capacity values — the grid connection is at top of tube. Only the filament goes through the press. 1/4" separation between all points of support. Lower losses at all wave lengths. **\$3.00** particularly useful on 5 meters.

Hundreds of other items at Big Special Prices. Constant changing of prices and merchandise makes it impossible for us to issue a catalog. Let us quote you on your needs

NOTE—ABOVE PRICES INCLUDE GOVT. TAX



45 Vesey Street, New York City

New York Headquarters for Transmitting Apparatus

WHEN IN TOWN VISIT OUR STORE

MAIL ORDERS FILLED SAME DAY

10% Cash

Must Accompany All

C. O. D. Orders

Say You Saw It in QST — It Identifies You and Helps QST

79

Jewell Radio Company

POWER AMPLIFIERS **A SPECIALTY**
PACKS SUPPLIES

Exclusive Eastern Distributors for

PURADYNE PRODUCTS

Reg. U. S. Pat. Office

PURADYNE Power Transformers are designed for continuous operation at full load. The insulation test at a potential of 10,000 volts insures satisfactory operation under all possible conditions.

No.	Out Put Voltage	Filament Voltages	Watts	Price
80	2500-0-2500			
	1500-0-1500		850	\$12.50
	1000-0-1000			
50	1000-0-1000		500	9.00
	1500-0-1500			
40	1000-0-1000		400	7.50
10	750-0-750	7 1/4 V. c.t.-7 1/4 V. c.t.	325	5.00
10A	600-0-600	7 1/4 V. c.t.-7 1/4 V. c.t.	200	4.00

No.	Out Put Voltage	Filament Voltages	Watts	Price
80	2500-0-2500			
	1500-0-1500		850	\$12.50
	1000-0-1000			
50	1000-0-1000		500	9.00
	1500-0-1500			
40	1000-0-1000		400	7.50
10	750-0-750	7 1/4 V. c.t.-7 1/4 V. c.t.	325	5.00
10A	600-0-600	7 1/4 V. c.t.-7 1/4 V. c.t.	200	4.00

Shielded with stand-off insulators
No. 80.....\$14.00 No. 40.....\$9.00
No. 50.....10.50 No. 10.....6.00

PURADYNE Filament Transformers, 10,000 v. insulation in metal cases with stand-off insulators: All guaranteed for six months against any defects.

Type	Volts	Amps	For Tube No.	Price
A	2 1/4	12	866's	\$3.50
B	2-2 1/2	10 each		4.50
C	5	20	872's	6.00
D	7 1/2	7	210, 250, 281's	3.50
E	2 1/2	6 each		4.50
F	3-7 1/2	6 each		6.50
G	10	7 1/2	203, 211, 852's	4.00
H	12	12	204, 212 D's	4.50
I	14	12		5.50
J	2 1/2-10V	10-7 1/2	Special	6.50

PURADYNE CHOKES in metal cases with stand-off insulators

Type	Henries	Mills	D.C. Resistance	Price
200 Single	30	125	260 Ohms	\$1.00
201 Double	30 ea.	125 ea.	260 Ohms ea.	1.50
202 Single	30	250 ea.	110 Ohms	3.00
203 Double	30 ea.	250 ea.	110 Ohms ea.	5.00
204 Single	20	500	90 Ohms	7.50
205 Single	20	750	110 Ohms	10.00

PURADYNE guaranteed transmitting filter condensers, metal cased with stand-off insulators. All condensers rated at a continuous working voltage:

Capacity	1000V.	1500V.	2000V.	3000V.	4000V.
1 mfd.	\$1.25	\$2.00	\$3.00	\$6.00	\$10.00
2 mfd.	2.00	3.00	5.00	11.00	18.00
3 mfd.	2.50	4.25	6.50	18.00	27.00
4 mfd.	3.25	5.50	8.00	22.00	36.00

PURADYNE Single Button Microphone lapel type \$2.00

PURADYNE Double Button Microphones broadcast type. A REAL BUY.....\$9.50

Microphone Transformers single button \$1.75; double 2.50

PURADYNE 50 Watt Sockets, heavy duty SPECIAL .75

PURADYNE announces a complete line of Power Supplies up to 5000 Volts D.C. output. If you have any Power Supply troubles **JEWELL** will cure it with a **PURADYNE POWER SUPPLY**; no more blown condensers, no more buzz-saw signals; all built on a metal chassis and guaranteed unconditionally for 6 months. Send for specification booklet.

Power Supply for 210 transmitter will supply 700 volts at 250 Mils. of pure D.C. current and will also supply 7 1/4 V. for 210 tubes, completely wired \$17.50; in kit form \$14.00

Power Supply for 50 Watt Transmitter will supply 1200 Vts. at 400 Mils. of pure D.C. Current and will also supply 10V. for 50 Watt Tubes; completely wired and guaranteed \$32.50

Prices on other Power Supplies on request.

250 Push-Pull Amplifier using 1-235—1-227—2-250 and 2-281 tubes using Amertran Audio. This Amplifier has a flat frequency characteristic from 30 cycles to 10,000 Cycles, ideal for Phone Transmitters and Speech Amplifiers \$30.00

AMERTRAN 250 P.P. Power Transformers 700-0-700 Volts, 7 1/4 V. c.t., 225 Mils. 325 Watts...\$4.75
300-0-300 Trans. with 5V. winding, socket mounted on top of Trans. for 280 tube.....\$1.00

MERSHON Electrolytic Condensers, metal cases 8 mfd. 450 Volts.....\$4.45
Voltage Dividers 18,000 Ohms for 245. P.P. 5 taps....\$5

Write for catalogue. It is free.

We Can Supply Anything — At Jewell's Prices — Ask For It.
Include postage with all orders and 20% deposit against C.O.D. Shipments

Jewell Radio Company

New Address: 110 Chambers St., N. Y. City

Phone Barclay 7-8937

Dept. S

Financial Statement

BY order of the Board of Directors, the following statement of the income and expenses of the American Radio Relay League, Inc., for the second quarter of 1932 is published for the information of the membership.

K. B. WARNER, Secretary

STATEMENT OF REVENUE AND EXPENSES FOR THE THREE MONTHS ENDED JUNE 30, 1932

REVENUE	
Advertising sales, QST.....	\$11,735.11
Newdealer sales, QST.....	10,017.03
Handbook sales.....	6,170.11
Beginners booklet sales.....	474.87
Membership dues.....	7,243.63
Membership supplies sales.....	1,807.48
Interest earned.....	368.62
Cash discounts earned.....	173.50
Bad debts recovered.....	81.09
	\$38,071.44
Deduct:	
Returns and allowances.....	\$ 4,170.73
Cash discounts on sales.....	212.51
Exchange and collection charges.....	50.60
	\$ 4,433.84
Less reduction of provision for QST newsstand returns.....	302.16
	4,131.68
Net Revenue.....	\$33,939.76
EXPENSES	
Publication expenses, QST.....	\$11,115.89
Publication expenses, Handbook.....	2,531.41
Publication expenses, Booklet.....	95.70
Membership supplies expenses.....	873.70
Salaries.....	17,737.44
QST forwarding expenses.....	553.12
Telephone and telegraph.....	331.02
Postage.....	1,072.96
Office supplies and general expenses.....	2,311.88
Rent, light and heat.....	1,126.61
Traveling expenses.....	1,447.83
Provision for depreciation.....	257.75
Commun. Dept. field expenses.....	106.66
Headquarters Station expenses.....	106.85
Bad debts charged off.....	884.00
Total Expenses.....	40,552.82
Net Loss from Operations.....	\$ 6,613.06

The Atlantic Division Convention

IT IS said that kindly deeds sometimes go unrewarded, but such apparently was not the case when the Columbia Broadcasting System placed at the disposal of the Convention Committee of the Washington Radio Club which sponsored the Atlantic Division Convention, held at the Hotel Mayflower, June 17th and 18th, their Coast-to-Coast Chain for the broadcasting of the speeches of the two principal speakers at the banquet, — Dr. Julius Klein, Assistant Secretary of Commerce, and Paul M. Segal, General Counsel of the League. Needless to say that this courtesy on the part of the Columbia people was appreciated.

Many delegates were so anxious for the opening of the convention that quite a number of them arrived the night before and started "hamming" immediately. If you do not believe it, ask

Proud of It?

Are you proud that you are an amateur — proud of your A.R.R.L. membership? Then proclaim it! Let the hams who meet you on the street, in the radio store, or traveling, know it. Wear your A.R.R.L. emblem!



The distinctive League emblem comes in four different forms. Its use by *members* is endorsed and encouraged by the League. Every member should endeavor to display the insignia of his organization in every possible way.

THE PERSONAL EMBLEM, in extra-heavy rolled gold and black enamel, just $\frac{1}{2}$ " high, supplied in lapel button or pin-back style, is recognized as the sign of a good amateur. Wear your emblem, and feel proud of having taken your rightful place in the radio fraternity. Either style, \$1.00, postpaid.

THE AUTOMOBILE EMBLEM, heavily enameled in yellow and black on sheet metal, will gain you friends. On the road, traveling, it identifies you as a real amateur. $5 \times 2\frac{1}{2}$ ", holes top and bottom. 50c each, postpaid.

THE EMBLEM CUT, a mounted printing electrotpe, the same size as the personal emblem, is for use by members on amateur printed matter, letterheads, cards, etc. \$1.00 each, postpaid.

THE "JUMBO" EMBLEM, an attention-getter for the shack wall or that 100-footer, is a big yellow-and-black affair $19 \times 8\frac{1}{4}$ ", same style as the Automobile Emblem. \$1.25 each, postpaid.



The AMERICAN RADIO RELAY LEAGUE

WEST HARTFORD, CONN.

SICKLES COILS

for the modern

HIGH-PERFORMANCE RECEIVERS

Shielded Intermediates

Shielded R. F. Units

Unshielded Units

R. F. Chokes

Interruption-frequency coils for 5-meter
super-regenerators

In the Single-Signal Receiver and all
high-frequency superheterodynes
where utmost precision is essential,
Sickles Coils are providing out-
standing results.

*All kinds of coils for all amateur purposes available.
Write for prices and further information*

The F. W. Sickles Company
Springfield, Mass.

NEW

REMLER CONDENSER MICROPHONE

BUILT FOR PROFESSIONALS—
LOW PRICE WILL INTEREST
THOUSANDS OF AMATEURS

Precision built by the "radio firm as old
as radio." Highly efficient, beautifully
designed. Gold plated head, non-
resonant molded grill, gold back plate,
moisture proof. Two stages of pre-
amplification, essentially flat response
from 40 to 10,000 C. P. S.; combination
50 and 200 ohm output. Plug-in bak-
elite head housing, copper shielded;
noiseless, may be A. C. operated with
power supply. Four models: floor, sus-
pension; desk and hand types. Send for
illustrated folder.

Transmitter head, list \$40.00

Suspension model complete with
pre-amplifier, as illustrated \$100.00

REMLER COMPANY, LTD.

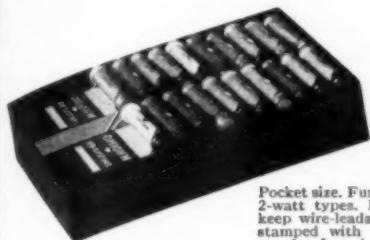
2101 Bryant Street San Francisco, Calif.



"Betty" Zandonini, W3CDQ. Convention Chair-
man Roy C. Corderman saw to it that the program
was carried out as planned, with the result that
everybody had a chance to hear and see every-
thing. Four big buses carried the delegates to the
Bureau of Standards where every one received a
cordial reception through the courtesy of Dr.
J. H. Dellinger and, under proper guides, an
opportunity given to inspect the "Bustan," to
the satisfaction of all. While this was taking place
the ladies were being shown around Mt. Vernon.
In the late afternoon, SCM Harry Ginsberg
presided at the traffic meeting, which proved a
regular forum. Mr. Caveness, SCM for North
Carolina, and his Route Manager Wright, told
what they did in their section, and that live wire
SCM from Virginia, Bob Eubanks, certainly was
prepared to demonstrate what his ORS do.
(Bob should receive a congressional medal for all
those charts.) The evening session proved most
interesting; and it was midnight before the
"gang" dispersed, some visiting "hamshacks"
and pounding brass the rest of the night. Dr. J. H.
Dellinger of the Bureau of Standards explained
fully the Standard Frequency Transmission of
WWV, being followed by Dr. L. P. Wheeler from
the Naval Research Lab. Lieut. Akre of Langley
Field brought with him two complete 5-meter
receiver-transmitters which one could carry in one
arm. An old-time amateur, F. D. Bliley, gave us
something to think about on "Tourmaline Crystals."
L. S. Fox, of the National Carbon Co.,
showed the latest development in a battery-
operated transmitter which should prove a boon
to those who have no electricity in their homes.
One of the very interesting lectures was that of
Mr. Paul Shallcross of the Shallcross Mfg. Co., on
the application of precision wire wound resistors.
Then came our old friend, Malcolm P. Hanson,
with his pictures of the Byrd Antarctic Expedi-
tion.

Bright and early Saturday morning the
"gang" gathered in front of the hotel and boarded
the buses for the trip to Anacostia, where the
U. S. Naval Research Laboratory is located.
And what a plant, — a real ham's paradise. Our
thanks to Doc. Taylor and his good assistant,
Dr. Wheeler, for the cordial reception. After a
dutch lunch, the afternoon session started with
Paul Segal, Counsel for A.R.R.L., who spoke on
the present status of amateur radio from a
regulatory standpoint. The army was well rep-
resented by Capt. N. L. Baldwin, so well known to
all of us, and the Navy by Lieut.-Commander
William Justice Lee. A. A. Hebert of A.R.R.L.
brought a wonderful message from President
Maxim, being followed by that real friend of the
amateurs, W. D. Terrell, Chief of the Radio
Division. L. C. Herndon, the R. I. for the 3rd
District, talked on "Interference Complaints."
The afternoon session ended with Doc. Woodruff,
the Division Director, with his "old bag of
tricks," and he always has something new, too.
The banquet left nothing to be desired and, with
the speeches of the evening by Dr. Julius Klein;
Paul Segal, C. M. Jansky and Hebert, amateur

The Call for Trained Radio Men Calls for the Right Products for Servicing Sets This Fall



FIRST-AID RESISTOR KIT

Pocket size. Furnished in 1-watt and 2-watt types. Protect-O-Packed to keep wire-leads straight. Each unit stamped with value. Includes free supply of service labels.



SPARK SUPPRESSOR SETS
for eliminating ignition interference on 4, 6, or 8 cylinder cars. Contain condenser and necessary suppressors.

OHM DIAL FREE

with initial order. Instantly tells resistance according to R.M.A. color code.

OHIOHM RESISTORS

FIRST-AID KITS

SPARK SUPPRESSOR SETS FOR AUTO RADIOS

THE OHIO CARBON COMPANY

12508 Berea Rd., Cleveland, Ohio

OHIOHM Resistors are made in Canada by C. C. Meredith & Co., Ltd., Toronto

OHIOHM

That Would-Be Amateur—

is he a problem around your station? Does he represent a factor for consideration at your radio club meetings? He deserves a lot of attention, you know, for he is the new blood that amateur radio and the A. R. R. L. need. Yet it is difficult to take the time to answer all his questions, lead him carefully through all the early mysteries of radio.

Happily, the problem is easily solved. You can save yourself a lot of trouble and make the would-be amateur happy by suggesting that he get a copy of the new second edition of the League's special beginner's booklet — "How to Become a Radio Amateur." In its 32 pages it outlines the field of amateur radio, makes learning the code easy, and tells how to build a simple station with clear illustrations and easily followed building instructions — and there's concise dope on getting licenses and operating properly, too. An inexpensive introduction to amateur radio, and preliminary to the Handbook. The price is 25c postpaid.

AMERICAN RADIO RELAY LEAGUE, WEST HARTFORD, CONNECTICUT

If you want to be a High Speed, Expert Operator write CANDLER for Free Advice

GET YOUR SPEED where the

If you want to copy press — send perfectly at 35 wpm or more with bug or key — copy 5 to 5 words behind — O. K. instantly — write Candler for free advice. The CANDLER SYSTEM of High Speed Telegraphing trains your Brain, Muscles and Nerves to Co-ordinate in doing fast, accurate work. It gives you CONFIDENCE, natural CONCENTRATION and banishes Nerve Strain. Original CANDLER METHODS have developed over 45,000 of world's fastest Morse and Radio operators including the champion.

TELEGRAPH-TOUCH-TYPE-WRITING — only method for operators. Shows how to use "mill" in receiving.

FREE advice. If you are a beginner and want to learn code the scientific way, or if you want to become a real EXPERT, write Candler and receive the benefit of his 20 years' experience in developing EXPERTS. Your questions will be answered promptly and personally. No obligation.

Champions got their CANDLER Scientific Method, High Speed Telegraphing

3 Times World Champion Operator Candler Trained

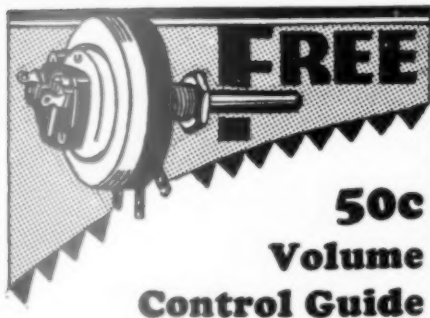
"By applying Candler System methods I won the Radio Telegraphic Championship of the World 3 consecutive years at 50, 55 1/10 and 56 3/4 wpm. I say to all Commercial and amateur operators, by all means take Candler High Speed Telegraphing and 'Mill' Courses."

THEODORE R. McELROY, Official Radio Champion of the World, Retired, Boston.

WALTER H. CANDLER World's Only Code Specialist, Instructor You Personally



Candler System Co., Dept. 56
6343 South Kedzie Ave. Chicago, Illinois



FREE

50c
Volume
Control Guide

with additional "dope" is just off the press. It is FREE with your order of only Five (5) Centralab Replacement Volume Controls. Centralab Controls are now offered at new low prices.

Centralab

Central Radio Laboratories
Milwaukee

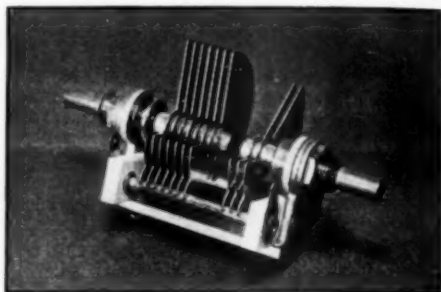
radio in all its ramifications was well covered. There were few contests, and the award of the prizes for same and the door prizes concluded one of the most successful conventions ever held in the Atlantic Division. Well done, Washington!

— A. A. H.

New Band-Spread Condenser

BAND-SPREADING condensers consisting of a relatively large-capacity "tank" section and a low-capacity section for actual tuning have been manufactured for quite some time, but so far as we know the condenser illustrated is the first midget condenser of this type.

Each of the two sections of the condenser may be individually tuned by its own shaft. The large



section has a maximum capacity of 100 μ fd. and the smaller 35 μ fd. The plates are of lacquered brass, with all joints soldered. The insulation is isolantite. The condenser is adapted either for base mounting or single-hole panel mounting.

The new band-spread condenser is made by the Hammarlund Manufacturing Company, 424 W. 33rd St., New York City.

The Central Division Convention

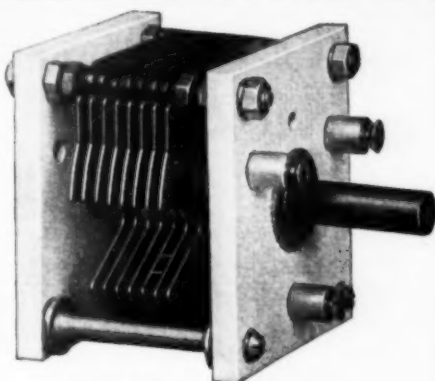
THOSE amateurs living within a radius of 150 miles of East St. Louis, Illinois, who did not attend the convention sponsored by the Egyptian Radio Club and held at the Knights of Columbus Hall on June 25th and 26th, missed a good time. While the attendance was smaller than expected, it enabled those present to become better acquainted. No set technical speeches were booked, but informal talks were given by Mr. Bidwell, W9FIS, of East St. Louis; Earl Linder, president of the club, and A. A. Hebert of A.R.R.L. Headquarters. Trips were made to KMOX and Cahokia Power Plant. From about midnight till the wee hours, most of the delegates were entertained at the original "Podunk" Shack of the Club at Nameoki. The gang is to be congratulated in having a real clubhouse with full equipment, although we understand some one broke in a while ago and took away the best part of the apparatus. (Fellows who do that are not "hams," and should be put behind the bars. — Ed.)

Sunday forenoon was lazy-time for all of us. In the afternoon another trip was made to Parks Airport Aviation School, the largest in the coun-

THE CONDENSER WITH THE REMOVABLE SHAFT

The shaft of this condenser, to which the dial is attached, is removable without in any way disturbing the suspension of the rotor plates between its bearings. You may mount this condenser in tandem by means of a double-length bakelite shaft or by means of a metal shaft if you want a grounded rotor.

PRICE \$4.00



TYPE 568-D, 175 μ f maximum,
SLC Plates
TYPE 568-K, 50 μ f maximum
SLF Plates

Address orders and inquiries to the General Radio Company, 30 State Street, Cambridge, Massachusetts, or to our Pacific Coast Warehouse at 274 Brannan Street, San Francisco.

GENERAL RADIO Co.

INSTRUMENTS OF PRECISION AND DEPENDABILITY

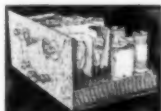
SILVER MARSHALL 726SW Varlo-Mu Pentode

11-Tube All Wave Superhet
10 to 500 meters **\$44.50 Complete**

Compensated SM Dynamic Speaker—RCA Licensed Tubes Built in ABC Power Supply—110 volt A.C. Brand New and a Original Factory Packing. Send only \$5.00. Balance C. O. D.

Southern Products
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Speaker not shown



LOW RANGE FUSES

- Littelfuses for Instruments:** Amps.: 1/100, 1/32, 1/16 — 20c ea. 1/8, 1/4, 3/8, 1/2 — 15c ea. 1, 2 — 10c ea. For milliammeters, ham rectifiers, etc. Use 1/8 for radio B circuits. *High Voltage*
- Littelfuses:** 1000, 5000, 10,000 volt ranges in 1/16, 1/8, 1/4, 3/8, 1/2, 3/4, 1, 1 1/2, 2 amps. Renewable. Price 35c to \$1.25 ea. Write for instructive bulletin 4-A.

LITTELFUSE LABS. 1772 Wilson Ave., Chicago

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BLILEY CRYSTALS / Quartz and Tourmaline

Nationally recognized for their high standard of quality.

Quartz crystals supplied by your dealer close to specified frequency in 1750 and 3500Kc bands, \$5.50. Mounting, \$2.50.

Tourmaline Discs within 7,000Kc band, \$12.00; 14,000Kc, \$14.00. Special mounting, \$2.50.

Send for literature.

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Masonic Temple Bldg., Erie, Pa.

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"EMP-LAB" TUBES!

Guaranteed firsts!

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- 866 Standard Quality . . . 2.00
- 871MV 2500V, 300 mill. . . 1.75
- 280M 700V, 300 mill. . . 1.60
- 82MV 650V, 400 mill. . . 1.05
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CRYSTALS

\$3.95

- 3500-4000 kc. 1" sq. x or y cut
- 1715-2000 kc. band \$3.95
- 7000-7300 kc. band 8.75
- All xtals one-tenth 1% ur spec. freq.
- Finished and unfinished blanks

5 METER SPECIALS!

- New! 5 meter 210, grid lead in top, low capacity \$4.95
- Int. Freq. Transf. for QST July '31 5 meter super-regen. recvr. Why spend a fortune for \$36 wire? Neatly assembled \$9.95

Our policy! Satisfaction guaranteed!

FOR LESS THAN \$20

Crystal Controlled Transmitter and power supply. All RCA tubes, crystal ground 1/10 of 1% your spec. freq., milliammeter, metal cabinet, vernier dial, assembled and wired.

Write for full sensational details

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Arcturus pioneered the most modern tube developments—long life, quick-heating, unitary structure—and many major advances in a. c. tubes.

ARCTURUS RADIO TUBE COMPANY, NEWARK, N. J.

ARCTURUS

The BLUE Tube with the LIFE-LIKE TONE

try, and after looking around it made many of us feel like taking the course. The courtesies shown were appreciated, especially by those fortunate ten who won airplane rides, and the pilot was not stingy, either.

The evening banquet was of the best, and words of wisdom were given by Harry La Mertha, Radio Editor of the *St. Louis Globe-Democrat*, and Treasurer Hebert of the A.R.R.L. Unfortunately Director Windom, who was expected, telegraphed at the last minute his inability to be present due to tear gas poisoning. The musical numbers by a number of children entertainers were good and helped to digest the good food served. As a closing event of the evening an initiation into the Royal Order of the Wouff Hong was staged and, with the distribution of prizes, ended two days of pleasure not to be forgotten by those who attended.

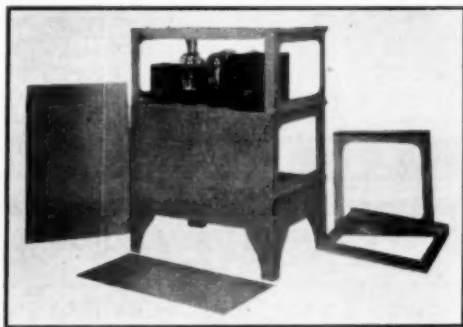
The thanks of all to Harold Jansen, who shouldered most of the responsibility and his committee, not forgetting the St. Louis "bunch" who helped to make this affair a success by their attendance.

— A. A. H.

New Rack and Panel Units for Transmitter Construction

AMATEURS who prefer the "commercial" rack-and-panel style of construction will be interested to know that it is now possible to obtain all-aluminum frames, panels and bases for the construction of such equipment on the unit plan. The photograph shows a rack in the process of construction, and indicates the method of mounting the parts on the shelves.

The bottom section is a cast-aluminum base with legs, measuring $15\frac{1}{2}$ inches wide by $10\frac{1}{4}$ inches deep and 7 inches high. A similar base with shorter legs, making the total height 3 inches, also



can be obtained. The side frames, also cast aluminum, measure 10 inches high and $9\frac{3}{8}$ inches long, two being required to build up each section. The shelf for holding apparatus is a plate $15\frac{1}{2}$ inches by $10\frac{1}{4}$ inches and $\frac{1}{4}$ inch thick, with ribs on the front and back to add strength and rigidity. When the parts are bolted together the entire frame is very solid and rigid. Any number of sections may be used, and additional sections may be easily attached to an existing transmitter as

Special M. & H. Price for Parts for Single Signal Super, Designed by James Lamb, QST, for August

Aluminum cabinet cut to size and bent with all hardware.....	\$ 6.71
Kit of all resistors including volume control.....	1.93
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Oscillator coil assembly with switch, coils wound by Nat'l.....	4.50
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Quartz crystal for special filter including air gap holder.....	9.00
Intermediate frequency transformer and filter unit with switch.....	4.40
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Coil sockets, screen grid clips, shield wire and tuning dials	3.96
Heavy Filament hookup wire, extension shafting, screws, etc.....	.94
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of
Service

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GOODS CO.**
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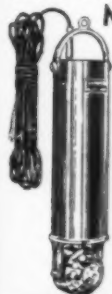
Specialists
in Radio
Equipment

A manual is now available describing COLLINS transmitters, speech equipment, condenser microphones and transformers, complete with full specifications and circuit diagrams.

Send 25c in coin

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W9CXX, CEDAR RAPIDS, IOWA

UNIVERSAL BULLET TYPE MICROPHONES



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Hiss Eliminating Filter**

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VALUES!**

Franklin Transformer TP3, 1500 Volts C.
T. at 300 M.A., Two 7 1/2 Volt
C.T. at 3 amp. each. Weight \$5.75
14 lbs.

Dubilier uncased 90c
1 mfd. 1000 Volts

2, 3, and 4 gang Variable Condensers. With trimmers — while
they last. Each 25c

Dubilier Dry Electrolytic
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Full stock amateur and servicemen's parts at lowest prices

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87

QST Oscillating Crystals

"SUPERIOR BY COMPARISON"

Does the frequency of your monitor comply with the new regulations of being within the plus or minus 50-cycle limits? If not, we are at your service to adjust your monitor to within those limits. SHIP YOUR MONITOR TO US for either adjustment or grinding a new crystal if necessary. Our charge for this service is right, and will require but SEVEN to TEN days to perform this work. ASK ANY BROADCAST ENGINEER what HE thinks of our service.

CRYSTALS - CRYSTALS - CRYSTALS

Prices for grinding POWER CRYSTALS in the various frequency bands are as follows:

FREQUENCY RANGE	
100 to 1500 Kc.....	\$40.00
1501 to 3000 Kc.....	\$45.00
3001 to 4000 Kc.....	\$50.00
4001 to 6000 Kc.....	\$60.00

Above prices include holder of our Standard design. If crystal is wanted unmounted deduct \$5.00 from the above prices. Deliveries can be made within two days after receipt of order. In ordering please specify type tube, plate voltage and operating temperature. Special prices will be quoted in quantities of ten or more.

POWER CRYSTALS FOR AMATEUR USE

The prices below are for grinding a crystal to a frequency selected by us unmounted (if wanted mounted add \$5.00 to the price list) with a calibration accurate to BETTER than a tenth of one per cent. Immediate shipments can be made and all crystals guaranteed.

1715 to 2000 Kc. band.....	\$12.00 each
3500 to 4000 Kc. band.....	\$15.00 each

LOW FREQUENCY STANDARD CRYSTALS

We have stock available for crystals as low as 13 Kc. Prices upon receipt of specifications.

SCIENTIFIC RADIO SERVICE

124 Jackson Ave., University Park
Hyattsville, Md. "Crystal specialists since 1925"

SUPER-SPECIALS

RCA LICENSED TUBES

These tubes stand up! If they didn't, we could not sell them with an Unconditional Guarantee for Three Months! Every tube is tested and dated before shipment.

112-A.....	50c	227.....	35c	280.....	45c
201-A.....	40c	233.....	80c	281-M.....	\$2.25
226.....	40c	238.....	85c	199.....	65c
232.....	80c	250.....	95c	224.....	50c
237.....	70c	866.....	\$1.65	231.....	65c
247.....	75c	171-A.....	45c	236.....	60c
871.....	\$1.55	222.....	\$1.10	245.....	45c
120.....	60c	230.....	65c	281.....	\$1.10
210.....	\$1.10	235.....	55c	280-M.....	\$1.25
		240.....	90c		

G. E. OIL TANK FILTER CONDENSERS

Three 5 Mfd., 2000-Volt DC Working units connected in delta in heavy metal case with large stand-off insulators. 10"x5"x10 1/2", 22 lbs.....\$9.75
Same but 2500 Volt. 15"x3"x13 1/4", 35 lbs.....\$11.75
Heavy Duty 20 Henry, 400 Milliamperes POWER CHOKE. FB for choke input to filter. 3000-Volt insulation. 70 Ohms. Open Frame mounting. 8 1/2 lbs. Special.....\$2.85

MAJESTIC. Two 15 Henry, 200 Milliamperes, 200 Ohm power chokes in metal case. Used but perfect. 7 lbs.....\$1.95
Thorderson Double Choke. Two 30 Henry, 150 MA power chokes in a metal case. 7 lbs.....\$1.95
Zenith Power Transformer. Delivers 600 volts at 80 MA, 7 1/4 CT, 7 1/2, and 2 1/2 volts at 12 amps. Electro-static shield. Special.....\$1.95
Bristol microphone transformers. For single or double button mikes. Uncased, 90c. Cased.....\$1.75

GENERAL ELECTRIC 5 Henry, 1000 Milliamperes Filter Chokes. In neat metal cases. 5000-volt insulation. 25 ohms. 11 lbs. Special \$1.50 each. Four for.....\$4.95

20% deposit required with all orders

VISIT OUR NEW SALES ROOMS WHEN IN TOWN

HARRISON RADIO CO.

142 Liberty Street Dept. T-9 New York City

alterations or additions to the equipment are made. Aluminum panels in either 1/16th- or 1/8th-inch thickness can be obtained, cut to any size desired.

This material is manufactured by the Springfield Bronze & Aluminum Co., Page Boulevard, Springfield, Mass. Bases and frames for horizontal instead of vertical construction are also available, as well as complete cast aluminum cases for portable transmitters or 5-meter sets.

56-Mc. Rolls Up Its Sleeves

(Continued from page 29)

Probably the fastest work of all was a call for an ambulance from "Hill 6." When the rudder structure of one of the sail-planes collapsed, leaving the machine scudding over the terrain out of control, an ambulance call was snapped out and relayed to the airport. In less than a minute, and actually before the plane crashed into the trees, the ambulance had left the airport. Happily, the call turned out to have been unnecessary as the pilot miraculously escaped with a few bruises.

From the traffic standpoint, the A.R.R.L. message month divided the time of the meet into two periods. However, each of the three stations made the Brass Pounders' League during the second week of activities. A total of 1694 messages was handled—all on 56-mc. and all with duplex 'phone.

Credit for the work goes to the amateurs already mentioned in addition to Benjamin Kilpatrick, WSCDC; Walter Bloss, WSEKL; Roy Dahlhaus, WSABM; Cecil Kahn, WSBFF; William Tower; Grant Meeker, W8ADV; Marion Cook.

Sticks That Have Stuck

(Continued from page 24)

helps in raising the mast, but prevents bending, as well as permitting the amateurs to stop for a rest during the lifting process. It is also a good idea to have three persons handle the guy wires, especially when the mast nears the vertical position. By so doing, the guy wires are immune from tangling, and the top section is held in position without any fear of bending. When the mast nears the vertical position it can easily be pulled into place by using the guy wires. The pole should then be adjusted by the guy wires so that it is perpendicular to the earth, and the hole around the 6 x 6 filled with dirt. The guy wires can be secured to 2 x 4 pieces driven about three or four feet perpendicular to the guy wires. Guy wire connection should be as near the ground as possible.

One of the two masts erected in 1925 was still supporting an antenna (BCL) when I returned to the old QRA in 1930. I understand the other ran away on its third birthday with a young and dashing tornado that passed through Southeastern Illinois.

— C. J. Houldson, W1KP

A New Manual of Ultra-Short-Wave-Radio

Compiled by JAMES MILLEN and ROBERT S. KRUSE

*Crammed with invaluable information
for experimenters and amateurs*

Contains the history of Ultra Short Wave Development, articles about the Generation, Radiation and Measurement of Ultra Short Wave Quasi-Optical and Infra-Red Rays, the Commercial Application of Short Waves in Communication Work, the use of Ultra Short Waves in Medical Treatment, the use of $\frac{3}{4}$ -Meter and the 5-Meter Amateur Band, Uses of Ultra Short Waves for Television.

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or money order) for your copy



In 3 to 7 months we train you to secure commercial
license. Course consists of Wireless Code, Radio-phone,
Microphone-Studio Technique, Television and Aero-
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PORT ARTHUR COLLEGE
PORT ARTHUR, TEXAS

TUBES — 5 for \$1

224's 227's 245's
RCA Licensed AC Tubes 5-Day Replacements
224's and 227's are tested in receiver as amplifiers and de-
tectors. 245's tested in actual transmitter as oscillators and
amplifiers. Not less than an assortment of 5 sold. Send 15c
per five for postage.

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UNIVERSITY, ALABAMA
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AMATEURS West of
Rocky Mountains

We can supply all parts for
the new circuits

Send for your Catalog of
Nationally Advertised
Transmitting and Receiving Parts
at **LOWEST PRICES**

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dio, television and ignition, and RESISTORS
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Condensers and Interference Filters. Write for
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Look this service over let I.R.C. supply ALL your Resistor needs

COME to resistor headquarters no mat-
ter what your problem. Test for your-
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**PRECISION WIRE WOUND
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All You Need to Learn TELEGRAPHY

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Learn Telegraphy—the most fascinating profession—by hearing *real* messages—*sending* them. Interesting—simple—you learn quickly—at home.

TELEPLEX—the Master Teacher is used by U. S. Army, Navy and leading radio and telegraph schools. Entirely new code course in 12 rolls of tape.

During last ten years, **TELEPLEX** has trained more operators than all other methods combined.

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All Sizes Cut to Order
BAKELITE TUBING & RODS

Drilling, Engraving & Special Work

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6 x 5 x 9, \$1.80 — 6 x 10 x 7, \$2.90 —
7 x 9 x 14, \$4.60 and many other sizes

Special sizes to order

ALUMINUM CHASSIS

Threaded brass studs for 6/32 screws
Lengths from 1/2" to 6" — price 5c to 30c

Insulating bushings
for all size shafts
from 7/8" to 1.90 per
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Mail orders filled same day.

Couplings in
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— 15c

Transmitting frames and racks

UNITED RADIO MFG. CO.

191 Greenwich St., N. Y.

Established 1922

Solve Your Radio Problems with the Lightning Radio Calculator

Inductance
Capacity
Wire turns
Wire sizes



Frequency
Wavelength
Coil diameter
Coil length

NO KNOWLEDGE OF MATHEMATICS REQUIRED

No Charts — No Tables

All solutions in direct-reading answers immediately
See mentions on page 76 June QST and on page 16 August QST
Light cardboard—50c Heavy cardboard—\$1 Postpaid

Distributed by

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W1SL, Boston, Mass.

(Continued from page 48)

change from one band to another in a short space of time.

Two antenna systems are used for transmitting: The one for the 7000-kc. transmitter is a half-wave voltage-fed Hertz with a two-wire feeder, and the other consists of two 75-foot lengths of wire arranged as an "antenna-counterpoise." The latter antenna may be shifted to either set by a switch.

For 'phone work there is a Class B modulator and with two Type '10 tubes. This is a separate unit and may be seen in the transmitter photograph directly behind the microphone. The modulator output is cut into the high-voltage lead to the Class C amplifiers before the three-point switch controlling the plate power to the three transmitters so that modulation is available for any of the three sets, although of course never used on the 700-kc. band. A four-pole double-throw switch makes changing from 'phone to c.w. a simple matter. This switch, when thrown from 'phone to c.w., turns off the modulator filaments, shorts the modulation choke, and takes the power off the modulator plates.

Several receivers are in use at W1SL. The one used on the 75-meter 'phone band consists of a three-tube converter and a midget broadcast receiver. This may be seen at the left in the photograph of the receiving section. In the cabinet on which these receivers are placed is a National SW5. In this same picture, behind the microphone, is a National SW3 which is used for c.w. reception.

Recently Colonel Boyden has been interested in five meters and has done some good work. Two-way communication has been established between W1SL and a portable station on top of Mt. Wachusett, about 45 miles airline, and W1SL has been reported on this band by a station on a mountain south of Springfield, a distance of 90 to 100 miles.

The owner of W1SL is a Lieutenant-Colonel in the Signal Corps of the Massachusetts National Guard and Signal Officer of the 26th (Yankee) Division.

Results — International Contest

(Continued from page 78)

LOGGED IN OCEANIA

IN AUSTRALIA: J 5CG W9 GGY IN NEW ZEALAND: OA 4Z VU 2BG W 7DL

LOGGED IN SOUTH AMERICA

IN ARGENTINA: HC 1FG OA 4J PY 1BT 2BN W6 AHP W8 PE IN BRAZIL: EAR 9G 6WV HC 2JM K5 AC LU 3DH 7EF NY 1AB OA 4J W1 AE AKV AYR BEO CMX DBV EF LH MK VK W2 ADP APV BG BSR DJT W3 CCF CM DQ FO WA ZX W3 AIB ANU AOO ES W1 W6 AHP ANJ ANN BBZ BC BJA CCZ CJO CLP COQ DGO ECV EXO FAE JP KH KU LD SO VAU VET W7 ACB AFS AWZ AVJ BD COQ EK FU W8 AAU BNV BUL CSS DED DJV DV GBD PE SG YE W9 AEW ADN AZZ BIB DZX ERU GA GGY GV GDH GFZ IH IJ LY VL X1 AA AF AX X9 A IN CHILE: NY 1AB VE 2CX 3WA W1 ZJ W2 WC W4 AKH SI W5 ACD ADZ AJG ANU CAW CCZ GA IT TG W6 ADK AHP AM ANN BC BHP BVM BWK CCZ CLP CTP CUL DE DRE ECN YU W7 AVL AXA BD W8 DEE DWV PA QT ZY W9 ADG AEW AGV AKJ BBD BFB BVI CES COQ DKU EGD FOC GFZ GGY GV IH VL X1 AA AX N IN PERU: CM 8AZ VE 3WA W1 CMX MK W2 AZO BSR CTA DN W3 CCF CDK W4 ADJ BBR MR W5 AEJ ANU BRR GA HX IT SH W6 AEF AM ANN ASD BC BJA CCZ CIX CJO CTP DIO DWW JB KT RP YU W7 DL W8 AYO BKP CU DGP DV PA SG ZY W9 ADG AGQ AGV AKJ BFB BVI DKU EGD FLH GDH GFZ GV ID IH IJ X1 AA AX N X3 A

Odeon High-Grade Filament Transformer for 866 Tubes, Cased, 10,000-volt insulation.....\$3.70
 Two H.D. 866 Tubes, with Trans.....8.50
 Two Reg. 866 Tubes, with Trans.....6.50
 Pentode Adapters, Each......35
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RCA-VICTOR Hand Microphone
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NEW LOFTIN-WHITE
Direct Coupled Amplifier
 Completely wired — fully guaranteed

Pentode Model	Model
247	245
uses	uses
1-280	1-280
1-224	1-224
1-247	1-245
\$10.95	\$9.95
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Single and push pull 250 amplifiers

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90-Day Guarantee **Each**

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HEAVY DUTY 866
Guaranteed 6 Months
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 210 } LICENSED
 250 } TUBES
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 — RCA — surge proof quality. Conservatively rated at 1000 D.C. working volts. Compact in size and made in accordance with RMA specifications. Furnished in fibre boxes, wax dipped.

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1 MFD	\$.39	10% Off
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ELECTROLYTIC CONDENSERS
 8 MFD
 500 VOLTS
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 40 and 85 Mils.
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X or Y cut finished to any practicable specifications

160-80-meter bands.....\$5.00 Finished blanks.....\$2.00
 40-meter band.....7.50 Unfinished blanks.....1.00

Write for information on our new commercial and amateur type plug-in crystal holders which uses the famous TINICOSIL plates.

Fridgen & Barnes Radio, Bellefonte, Pennsylvania



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ULTRA-SELECTIVE

"Single-Signal" H.F. Receiver

as described in Aug. 1932, QST

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Send now 4¢ in stamps for your copy of this valuable booklet.

Resistors required for linear electronic voltmeters (Page 18, May QST) carried in stock.



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 Who considered the Handbook baloney;
 But his note went plop, plop,
 And his fone was a flop.
 His trouble was dope that was phoney.*

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